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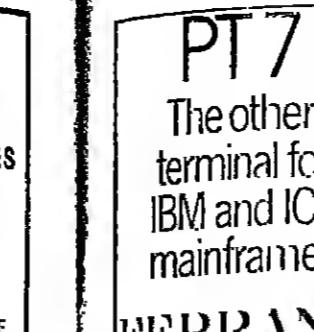
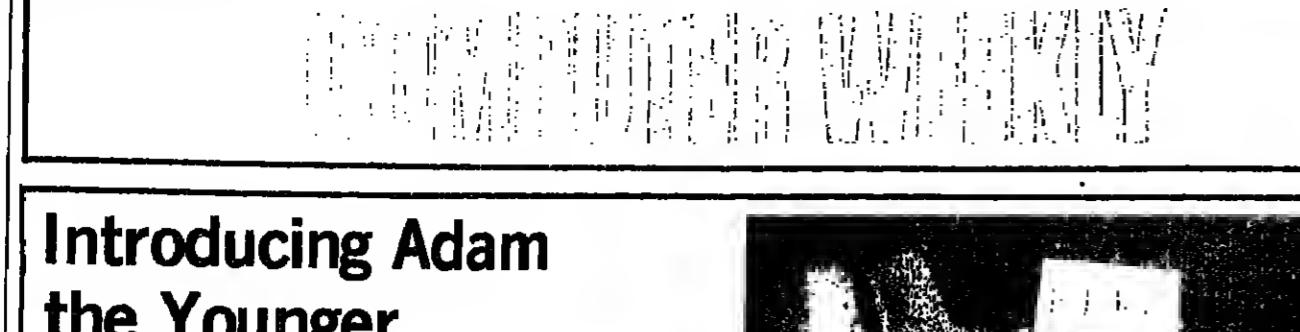
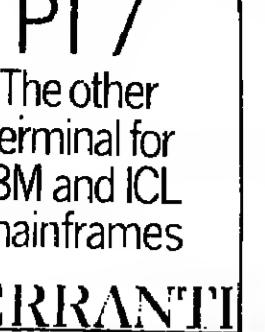
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THE future of the world, as seen through the eyes of IBM, is an irresistible topic for any speaker and a guaranteed attention-grabber at any conference.

An original and challenging thesis on the subject was presented in Shadow 11 users at a London conference by Richard Currier, marketing vice-president of Altergo Inc.

We should, he suggests, forget about E-series and H-series, and

## Leading into the electronic office

concentrate on word processing instead.

Noting that no new releases of Systems Network Architecture or IMS are scheduled, he deduces that IBM is hard at work re-writing them with a word processing slant and a 1980 deadline. He suggests that the result will be software which marries word and data processing, leading to an IMS database simultaneously used for text storage and numeric retrieval.

Satellite Business Systems, in which IBM has a one-third stake, is a major element in Currier's thesis. Satellites, he suggests, are really cost-justifiable only when they transmit large volumes of data or text.

Currier believes that IBM, with some 50 per cent of the

## FOCUS

MOST DPMs would acknowledge the importance of security. Most would also agree that their own installation security precautions are less than adequate.

Time is all too often the limiting factor. Next in line of obstacles to good security is human ingenuity. Operating routines are prime examples, and short cuts are almost standard. But in any case if strict adherence to installation rules and regulations were followed, the complete system could end up in a dead end, well and truly buffered. Users would not be over keen to know the reason for the non-delivery of vital reports; that two operators have to remain in the machines room at all times. If one or two leave to collect stationery, back-up discs or the latest copy of Computer Weekly, than it's a case of "one out — all out".

Often, DP management is content to have set-up security rules. Subsequent obediency to the rules is left to the good nature and intention of the DP team. Such practices would bring the National Computer Centre security team out in security rashes.

For the NCC, computer life is composed of constant threats. Installations are besieged by terrorists, marauders, saboteurs and vandals. Disasters, catastrophes and espionage lurk round every DP corner. DP personnel are variously labelled as being potential 'villains', malevolent, negligent or just corrupt.

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## Call for setting up of world telecoms authority

THE establishment of a world telecommunications authority to rationalise and standardise communications laws, taxes, tariffs and equipment was one of the possible future developments discussed at the first full meeting held under the auspices of the Brussels Mandate.

It is certainly worth keeping a close watch on IBM's strategy in the office products market, but the E-series should not be written off. There is little doubt that it will be with us within months. As for the H-series, something fairly enormous will be required to store all those files, even if the databases are distributed.

His idea of a large company's entire filing system being retained in some enormous electronic filing cabinet is probably quite feasible, given the phenomenal rate of decline in the cost per bit of hardware.

There is plenty of evidence that IBM is preparing to lead us into the era of the electronic office. It is noteworthy that the company demonstrated to the Press in Nice last year that the 3750 telephone-switching system could become the missing link in an electronic mail network of word processors and ink-jet printers.

Currier believes that IBM,

with some 50 per cent of the

club would be to make its deliberations public knowledge by having the minutes of its meetings generally available.

The third aim is to initiate studies into the laws in various countries relating to things that affect transnational dataflow like privacy. The actual studies would be carried out by academic institutions and other suitable bodies.

"The meeting also decided

that there was a real need for a much clearer distinction to be made between different kinds of internationally transmitted data, in order to separate data as a commodity from information in the broader 'humanitarian' sense.

"But before we can persuade

national governments to change their telecommunications laws and tariffs, a lot more people need to be involved in this debate.

Multinational companies with representatives at the London meeting last week included Control Data, Digital Equipment, Unilever, Manufacturers Hanover Trust, American Express and Massey-Ferguson.

Some of the other organisations represented were the Home Office, the Inter-Bank Research Organisation, the US Senate Foreign Relations Committee and the Italian intergovernmental bureau for information.

Coats have never been one of the more notable traits of the NCC, and this volume is no exception. The price of security is never mentioned, except in terms of "after it happens" penalties. Is there, for instance, such a thing as an average cost in respect to annual budgets for DP security? The book is heavy on check lists but typically unstructured on indexing.

Commenting on progress at the first meeting, Eger said: "Part of the purpose of this meeting was to define the role of the Brussels Mandate, and the consensus was that the club should have three main aims.

He came up with the idea of an informal club for influencing

world communications policy at the Online conference on transnational dataflow, held earlier this year in Brussels —

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# DOWNTIME

by Chad

## Read it and see

HERE is an oft-told tale about some monks in the Middle Ages who were trying to determine how many teeth a horse has. They pondered, they theorised, they searched exhaustively through Scripture, but still could not agree. Then one of their number suggested looking in a horse's mouth and counting the teeth. The other monks were horrified, appalled. They chastised their colleagues severely for making such an outrageous suggestion. Nowadays, of course, we realise how primitive and irrational they were. Nobody thinks like that any more, right?

Wrong.

General Motors in the States, suspecting that its technical manuals may be difficult to read, has devised a computer program that calculates the average sentence length and word length in a piece of text and comes up with an index of "readability."

Manuals that score badly are rewritten (by a human being).

## Keeping it clean

IN the world of high technology, keeping it clean is a serious business and the latest aid for keeping mucky people and clean computers apart is this chic little sumpter from Tok Chemicals.

The one-piece romper suit for adults is, I am told, made of a special non-woven fabric which is a much better bargain than more expensive woven material, and there are also, trousers, anoraks and other gear to suit the occasion. As well as protecting the last inside from oil stains of industrial hazards Confitak — that's what it's called — will also retain "body and undergarment dabs".

And after a hard day at the lab you could trot off to a fancy dress ball as an adorable snowman.

## Of mice and machines

FIRST heats of a worldwide micro-mouse contest, organised by the Institute of Electrical and Electronic Engineers, were held at the NCC at Anaheim. Contestants build a mouse from micro components and it has to find its way through a maze.

Although over 8,000 people have entered the 1978 competition, the organisers ex-



pected only about 800 eventually to turn up with the workable mice at heats to be held throughout the year.

At Anaheim, many of the entries failed to reach the starting gate and there were many aborted runs. One mouse, for example, kept getting as far as the first bend and then going back home.

Two parties wishing to exchange data or to access shared

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THERE will be significant progress on the development of standards for open system interconnection during the next fortnight with meetings being held in Washington, Paris and London by three specialist groups

working under the auspices of the International Organisation for Standardisation. UK participation in these studies is the responsibility of a British Standards Institution committee known as DPS/20. This article emphasises the need for standards in this area and outlines the technical approach being taken. It was prepared on behalf of DPS/20 by a group chaired by Dr Roland Rosner.

# Standards for open system interconnection

Here is a passage that failed the test: "If your vehicle is equipped with a stowaway spare tire, your spare is designed to provide you with more usable interior space. The spare is located in a deflated condition resulting in a reduced overall diameter."

After rewriting, it became:

"If your car has a stowaway

spare tire, your spare provides you with more usable storage space since it is stored deflated."

The mind reels. If you want to know if something is readable, you don't stick it through a computer, you read it. Writing style is a wholly subjective thing, and no amount of computer analysis will make such a concept feasible but only if the appropriate standards can be specified and universally adopted. This article outlines some of the benefits to be derived from open working and describes the work being undertaken by the standards organisations towards this end.

The property of "openness" is intrinsic to any general communications medium such as the postal and telephone services.

The advent of new public data networks creates the possibility of extending such openness into the area of computer systems.

This could lead not only to enhanced usage of existing facilities but also to the introduction of a wide range of new applications such as the "cashless society", electronic mail and home computing. Users will be able to access an ever-increasing number of services from the same terminal equipment; information will be readily exchanged among different machines; tasks may be performed by partitioning them for execution on several co-operating computers; databases and access to them may be geographically distributed.

The British Standards Institution was among the first to realise the importance of standards for open system interconnection and last year proposed to the International Organisation for Standardisation that the subject merited the establishment of a specialist sub-committee. The proposal was accepted and the ISO Technical Committee 97, which handles standards for computing, set up a new group with the formidable identifier ISO/TC87/SC16. To co-ordinate the UK participation in this work, BSI/DPS/20 was formally established as a sub-group of the BSI Data Processing Committee. DPS/20 is now actively engaged in its work and has identified an initial set of topics to be studied

in depth by its working groups. At the recent meeting of ISO/TC87/SC16 in Washington, the sense of urgency generated a welcome spirit of international co-operation and a realisation that, to be more manageable, the subject should be divided into three smaller areas. These three sub-groups will cover all the subject matter of the UK working groups.

Advances in computer and telecommunications technology now make distributed systems technically feasible and economically attractive. However, whereas standards in areas such as card codes are a convenience when decks are moved from computer to computer, open system interconnection is absolutely impossible unless the appropriate standards are specified and implemented.

If standards are not agreed quickly then pressures from powerful customers will force manufacturers to adopt less than ideal de facto solutions. The telecommunications industry which sees in open working the possibility of immense extensions to its business realises the importance of standards in bringing this about. The administrations of the new public data networks have indicated through their International organisation CCITT that they might take their own steps if there is undue delay by the standards bodies.

Historically, it was the need to access powerful mainframes and centralise databases which stimulated the development of computer communications systems. This led to the concept of the familiar star network with a number of remote terminals around a central computer.

Within such a closed system, the computer determined its own rules to be obeyed by all the terminals and intelligent devices requiring access. The result has been a proliferation of proprietary conventions which have very little in common with each other.

Two parties wishing to exchange data or to access shared

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Information could agree

Handling a small  
tricky problem

just like a Grandmaster

IT IS not customary for this column to eat its words. Today, however, I think that a judicious eating of the word "not" may be in order.

In my fantasy of the British Cabinet attempting to discover in 1986 what is meant by "expert system" I said that "not a single centre in the UK is engaged in such studies" (Privateview, March 30). Those amazement and useful programs are proliferating with gusto in America and Japan. I have, for example, noted in this column Todd Wipke's program SECS among others. SECS acts as an intelligent assistant to chemists desirous of planning ways of synthesising new compounds (Privateview, January 19).

However, I overlooked the North London Polytechnic where they have mounted the chemistry program LHASA, described by its British co-developer Dr A. P. Johnson as "superior to SECS in many aspects of its performance". The work is an off-shoot of Professor Corey's laboratory at Harvard University in the US, where Dr Johnson spent a sabbatical year. The Science Research Council contributed the graphics facilities needed to run the program over here and continue its development.

Almost everybody tends to confuse "expert systems" of the SECS and LHASA kind with very large databases of useful scientific facts. The difference is that you can only answer a question by reference to a database if the answer is already stored there. An "expert system", which may itself enjoy access to one or more databases, answers questions by reasoning and intelligent conjecture. What it stores consists not only of individual facts but also of more general patterns, rules and "theories", by means of which it infers its answers.

Together with our own miniature "expert system" for chess endings at Edinburgh (also developed with assistance from the Science Research Council) we have access to a database for the complete sub-game king-rook-king-knight. Tim Niblett has used this database to show that the expert text on this ending, prepared by a great Grandmaster before the computer era, is seriously incomplete and erroneous.

The expert system for this same ending differs from the database in many ways, in-

cluding its small memory requirement. Within this condensed space it deploys a repertoire of pattern-based rules, constraints and goals, and handles this small but tricky problem like a master. We hope to teach it to do a good deal better than the average master!

The king-rook-king-knight database comprises some 3½ million legal positions. Addition of another two or three pieces to the board would create endings for which database construction would not be feasible because of the combinatorial increase in size of the problem space. For such endings an "expert system" is the only possible approach.

With so many ending applications for "expert systems" in geology, medicine, botany, chemistry and other branches of applied science, why cheat? Such a game is surely a parlour accessory rather than an instrument of serious business!

To answer this would require a separate article. Let me here only list four fundamental questions on which research is needed: (1) machine representations of human knowledge, (2) numerical measurement of knowledge thus represented, (3) methodology for ensuring and certifying reliability of expert systems and (4) conversion of knowledge refined by machine into human-useable forms. These basic questions can make fast progress, in my view, if applied studies are coupled with "test-tube" investigations.

For these, chess is ideal, not least because for more than a century highly trained human intellects have done the best job they could at intensively refining and codification of this particular domain of knowledge. If we believe, as I do, that computers have given us a new trick, by which vastly improved codifications can be made, then it behoves us to use for comparison the best specimens of the pre-computer art that can be found.

The first autocodes were tested using "test-tube" arithmetic. So in the development of new species of knowledge-handling languages experiments with the re-codification of chess skill have a part to play.

Donald Michie

## TREND

### Printer 800 RO



## PROGRAMMER NOTES

### Some approaches to problem-solving

LAST week's Programmer Notes introduced some of the basic concepts of Lateral Thinking such as de Bono's use of random juxtaposition in problem solving.

#### Puzzler

If BOY asks GIRL to be his wife, When both are in the prime of life, And LOVE is still but not much hope, Then they will certainly ELOPE.

No, this is not Poe's Corner, but merely my introduction to this week's cryptarithm.

BOY  
GIRL  
LOVE +  
-----

Both BOY and GIRL are prime numbers. See page 53 for solution.

approaches to finding solutions using the methods already outlined.

The first of these techniques is called by de Bono, General Strategy. Avoiding the nitpicky implementation details, this approach concentrates on the basic themes focusing where appropriate on considerations of cost or time.

Having done this, the question each objective or alternative can be solved using various criteria. Such interrogations could, for example, establish the relative importance of paying salaries, collecting taxes and simplifying manual procedures.

A deliberately introduced provocation, perhaps an analogy, can be used to sort out the alternatives. Take, for example, an analogy with an area where having such an idea will yield considerable benefit. It is important, at this stage, to try to ignore possible practical difficulties.

In the payroll case, should the egg or salary be kept separate from the rest of the management costing date, rather than attempting to process both together? Possibly two systems be used instead, rather than trying to meet both aims with one solution.

Next, try and spell out all the basic aims of the project. This

objectives of a payroll system might be to pay salaries, collect taxes and national insurance, supply time-sheet costing information, and to simplify the pay-clerk's tasks.

Having done this, the question each objective or alternative can be solved using various criteria. Such interrogations could, for example, establish the relative importance of paying salaries, collecting taxes and simplifying manual procedures.

De Bono's third problem-solving method is probably the most confusing, based on the notion of an Idea Sensitive Area (ISA) (as de Bono calls it) involves finding an innovative concept in an area where having such an idea will yield considerable benefit. It is important, at this stage, to try to ignore possible practical difficulties.

In the payroll case, should the egg or salary be kept separate from the rest of the management costing date, rather than attempting to process both together? Possibly two systems be used instead, rather than trying to meet both aims with one solution.

After General Strategy, the second technique is Implementation and Tactics. This involves

## SOFTWARE FILE-1

### DEC launches TP system for PDP-11s

A TRANSACTION processing system has been introduced by Digital Equipment for the PDP-11 minicomputer family. Called Trax, an essential component of the new system is DEC's first block-mode intelligent terminal, designated the VT62.

Trax runs on the 11/34, 11/60, and 11/70 supporting 16 terminals simultaneously on the 11/34 and up to 64 terminals on 11/70. User application languages supported are Cobol and Basic Plus 2.

The VT62, a new microprocessor-based VDU, is used to provide basic screen handling and data validation functions. Programmed in an English-like Applications Terminal Language (ATL), the terminal relieves the central processor of data validation tasks.

Trax fills a long-standing gap in DEC's software for the PDP-11 range. As a result, one system developed by DEC for a specific customer has already been adopted by the company's Special Systems Division. Introduced earlier this year (CW, January 15), TPA 70 is said to have no direct relationship to Trax.

#### SOFT BITS

### Accounting package

A RESOURCES accounting package has been produced by ICL Dataskill for 2900 users running under VME/B. The package processes data in the VME/B Accounting Journal to generate resource utilisation reports.

The routines also provide for the definition of installation charging rates, so that invoices can be raised automatically. In addition, ancillary charges, such as for data preparation, can be included on reports and invoices together with explanatory text.

In support of TP operations, the system includes facilities for restart/recovery, data protection, file organisation and record access.

A NEW package from SPI is designed to facilitate the connection of remote polled terminals using 3270 protocol to a PDP-11 running under RSX-11M. The software, written in Macro II assembler, consists of a DVII driver handling a binary synchronous line in non-transparent EBCDIC mode, and a 3270 protocol handler running as a system task.

A GENERAL ledger system designed for financial management has been launched by K3 Software Services of Worcester. Written in Cobol, the package will probably be of most interest to existing mainframe or minicomputer users, says the company, K3, a subsidiary of Kahanuza, was formed earlier this year (CW, January 12).

Spelling out each possible implementation method, including obvious, logical approaches and then analysing each possibility identified.

In a supermarket, one basic problem is optimising distribution of goods within the shopping area, as what, for example, would be the best method of implementing a test system other than trying every commodity in every position?

De Bono's third problem-solving method is probably the most confusing, based on the notion of an Idea Sensitive Area (ISA) (as de Bono calls it) involves finding an innovative concept in an area where having such an idea will yield considerable benefit. It is important, at this stage, to try to ignore possible practical difficulties.

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## SOFTWARE FILE-2

### Program exchange scheme likely to be opened to all

A SCHEME for the exchange of educational programs is likely to open its doors soon to include individual in addition to institutional members.

The Central Program Exchange, previously known as the Physical Sciences Program Exchange, is also broadening its range to include engineering, mathematics, computer science, biology, and management sciences.

to permit experiments which would otherwise be too costly or difficult to perform.

Originally a project within the National Development Programme in Computer Assisted Learning, CPE was established almost five years ago (CW, October 11, 1973). It is based at Wolverhampton Polytechnic, under the direction of Dr Brian Beech.

CPE offers members a program library currently containing around 175 items. In exchange for a £25 initial 30 programs, each further program taken incurs a £2 handling charge.

Alternatively, if a program submitted is

accepted for the library, a further four programs may be selected free of charge.

The scheme, previously 100% funded by NDCAL, now meets half its operating expenses from subscriptions and receives the remainder as a grant from the Council for Educational Technology.

The Council has yet to approve the extension of the scheme to the personal computing fraternity.

If given the go-ahead, CPE is likely to offer a reduced rate to individual members, probably offering 10 initial programs for a subscription of £10.

Around 100 of the current programs are written

in Fortran, with the latter will run on a minicomputer in Basic. Most of

Dr Beech, and conform in machines, according to standard for Basic.

Programs submitted for inclusion in the NDCAL are tested by CPE on its own machine and sent for review to an acknowledged expert in the subject area covered.

Starting in September, the CPE is to publish a series of booklets describing the programs available in each subject area. Dr Beech noted that the scheme is thus offering academic recognition to program authors for the first time in the history of program exchange.

AN APL interpreter and a new very basic processor. One such is Hewlett-Packard's Implementation for the new System 45 desk-top computer, which permits names including up to 15 characters. Another is a commercial Basic developed by Logica for the Tandberg TDV 2100 terminal (CW, February 23).

Basic-V also offers extended facilities for matrix and array handling, including functions for matrix inversion and cross product generation. Arrays, which may have up to 255 dimensions, are limited in size only by the maximum virtual memory storage.

Several users may thus share the same copy of the language processor or concurrently execute the same copy of an application program.

Basic-V includes a number of interesting and unusual language features. One of these is the capacity for variable names up to 31 characters in length, in contrast to the great majority of implementations which allow only a single letter optionally followed by a digit.

Greatly improving program legibility, the facility for longer names has so far appeared in

### CICS users complain to Price Commission

UK users of CICS have complained to the Price Commission over IBM's increase in the annual rental charge. The complaint has been lodged by the UK CICS Guild group, a subgroup of the users group, Guide.

The programming group of the IBM Computer Users' Association has also voted in favour of pursuing an appeal. The two bodies are thus in effect taking joint action against the company.

Users were upset because the price rise, from £9,000 to £84,000 per year, coincided with a reduction in the level of support. Previously included as a programming product in service group B, the software now receives class C support.

The complaint relates only to OS Standard and DOS Standard versions of the TP monitor. Although also the subject of a price rise, CICS/VS is still supported at the same level and has recently been significantly upgraded.

Vsam supports all three types of VSAM data set, replacing IBM's more complex

#### Compower addition

The latest addition to the range of software offered by the National Coal Board's Computer Department is a system for the design and evaluation of multi-headed pipework systems.

The system, Pipeweasel, is available on the Compower network under a marketing agreement with Babcock and Wilcox, which developed the program suite.

#### Simplifying the interface with VSAM

IBM's chargeable Cobol VSAM feature.

VSAM offers a number of throughput advantages over ISAM, including reduced access time degradation as files become disorganized, and a consequent reduction in the frequency of file reorganisation.

Marketing agent for Vsamlo in the UK is RAS Systems Design, 48 Portland Avenue, Hove, Sussex. Tel: 0273-411109.



### Everything you need to know about DEC peripherals

Plessey offers a complete line of DEC compatible products. Reliability, quick delivery and substantial cost savings are some of the reasons for making Plessey your supplier. For complete price and delivery information, please contact your nearest listed sales office.

**PLESSEY**  
PERIPHERAL SYSTEMS

TELESALES OFFICES: Plessey Peripheral Systems, Harrowden Road, Northamptonshire NN4 0EB.

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TELESALES OFFICES

## Enhancements to Philips' WP 5001

FIVE enhancements have been introduced for Philips' WP 5001 word processing system. Communicator facilities have been added, enabling the machine to communicate with other WP 5001 systems over the dial-up telephone and IBM 3770 emulation. The Quine 28-inch carrier of people wanting to use the machine as a teletypesetter, character and with IBM and Philips mainframes, is now available.

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## CTL adds to top of its 8000 series

A DUAL-PROCESSOR system has been added by Computer Technology at the top of its 8000 series. Called the 8070, the new machine consists of two 8000 processors tightly coupled together and is claimed to offer up to 80 per cent more power than a single 8060. It runs under the standard Modus operating system which supports concurrent multilingual transaction processing, batch and apooling from both local and remote terminals. Languages available from CTL include Cobol, Fortran IV, Basic, Coral 66 and BCPL. There is also an Algol 68 compiler, and Manchester University has developed a stand-alone Pascal which does not run under Modus.

An 8070 with 112K 18-bit words of main memory and 96 Megabytes of disc cache just under £100,000, and can grow to a 224K-word system with 400 Megabytes on disc which, fully configured, costs about £250,000.

"We are competing with the top end of ICL's 2904, but our machine goes much higher," Roger Fulton, product manager at CTL, told Computer Weekly. "We can realistically support 64 VDUs and printers, and with the 8070 and the new 8020, announced last month, we have doubled the available price-performance of the range, which is field-upgradable right the way up."

There are two processors in the 8000 series. The 8020 is a low-cost but fully software-compatible version of the

standard 8030 processor; the 8050 adds extended store facilities to the 8030; and the 8070 is two 8050s.

"We sell mainly direct to the end user, sometimes in partnership with a software house," commented Fulton. "But we are planning to sell the 8020 to system builders, and are already negotiating one such OEM contract for it."

CTL hopes that availability of the 8070 will prove an added attraction to people considering products lower down the line, and is now concentrating most of its energies in the business systems market. About half the company's business comes from the commercial sector, with most of the remainder coming from the company's existing base in the educational, medical and instrumentation businesses.

More than £500,000 worth of the orders for the R-range have come from Czechoslovakian customers including Bistro, an engineering factory, part of a coal mining organisation in the Ostrava area; and Synthesis, a large chemical factory at Prague.

The local authorities which have ordered R-range systems are the London Borough of Lambeth and Rotherham Borough Council, both of which are having R300 systems with 12 terminals; and Doncaster Metropolitan Borough Council.

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**Versatec introduces vector to raster converter**

AN electrostatic plotter can be driven by a minicomputer at full speed using the vector and raster converter, introduced by the US firm Versatec, which has a UK subsidiary at Newbury, Berkshire.

The VRC is a 5½ x 18 x 20 inch box unit and has been designed to accept ordered vectors from a minicomputer and to send raster data directly to the plotter.

The VRC converts vectors to rasters at data rates of one Megabit per second.

Developed for the examination of alternative business strategies and is designed for use by business managers with no DP experience.

Honeywell says that with Tabol 2 it can offer across-the-board data handling services for management.

It is introduced as Honeywell takes a bigger interest in the worldwide Mark III operation with a 16 per cent share in a new company set up to sell the network (CW, June 18). GE owns the remaining 84 per cent.

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## PEOPLE

### Top appointments at new Plessey company

COMBINING the operations of Plessey Membranes Inc in Tewkesbury and Plessey Microsystems Inc in the US, Plessey Peripheral Systems Inc has been formed.

President of the new company is Melville Lamph, previously general manager of Plessey Microsystems, and Gerard Mottier, formerly general marketing manager — Europe, becomes worldwide marketing manager.

Replacing Mottier, Marcel Cornelius becomes European marketing manager. Michael Pringle becomes engineering support manager — Europe, and John Kilshy becomes administrative manager — Europe.

A North of England sales and service office has been opened in Manchester. The manager is Duncan Hilton, until recently a service engineer with PRL.

Brian Oakley has been appointed secretary to UK general manager Bob Jefferson, who retires on June 30. Oakley is an under secretary at the Department of Industry and has been head of Research Division since its inception in 1972.

Nick Blake, formerly marketing director of GEC Semiconductors, has become marketing manager of Ultra Electronic Components.

Pete Polizzano, previously regional sales manager with On-Line Distributed Processing, has joined ICL's 1500 product marketing manager.

Jack Letherbarrow, marketing services manager of Adler Business Systems, has been appointed director of distribution network.

Ronald Hooper, a director of Dublin, which manufactures electronic components, has been appointed deputy chairman.

Pete Hommington becomes sales manager at Terminal Display Systems. Prior to this he was district manager of ADI in Birmingham.

Diann Law outside Buckingham Palace, Diann who was ICL's education and liaison service manager, and educator, and training correspondent for CW, before suffering a stroke in 1977, was awarded the MBE for her services to speech therapy.

Brian Skomil, Southern regional sales manager with Rediffon Computers, has been appointed market development manager.

International Phil Northeast has joined Rediffon as Southern regional manager, from Burroughs where he was branch manager for Sussex.

As previously pointed out (CW, June 8), if all these factors can be made to come good, the company will be entering a major battlefield in world semiconductor markets.

Already, Motorola and ITT Semiconductors have joined Mostek, Intel, Texas Instruments and Fujitsu as declared contenders, with Hitachi, Toshiba and Nippon Electric about to join the fray.

The volume price for 64K RAMs in 1982 is already being estimated at \$20 to \$22 apiece.

This means that the new company will need to get its process running well very quickly, if it is to catch a major share.

Realistic estimates of the problems this poses can be gauged from the fact that initial production yields — the percentage of useable devices from the total processed — can be expected to be under 4%. With perhaps only 10 wafers processed per hour, at least until the process is running smoothly, and with only one shift per day — production staff will need to be trained — the initial cost per good chip could be over £100. That is, unless the NEB defers a pay-back on the investment or writes it off.

Research and development costs inevitably require considerable elasticity, and long-term funding in this area must be an item for consideration by the NEB and the group of engineers behind the company.

Given the £50 million total budget, it seems certain that much of the initial R&D will already have been done.

From this it follows that much necessary to manufacture the memories will be imported from the US, even though the NEB feels this is unlikely. American companies use American equipment.

Such a sum would be split between establishing a wafer-fabrication facility capable of producing the 64K RAMs the company will be making — estimated at between £14 million and £17 million, assembly and test equipment, and research and development. These last items are difficult to forecast.

Assembly is usually carried out off-shore in cheap labour areas, but with the quoted estimate of 4,000 jobs being provided in three to four years, it must be assumed that assembly will be done in the UK.

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This means that the new company will need to get its process running well very quickly, if it is to catch a major share.

Realistic estimates of the problems this poses can be gauged from the fact that initial production yields — the percentage of useable devices from the total processed — can be expected to be under 4%. With perhaps only 10 wafers processed per hour, at least until the process is running smoothly, and with only one shift per day — production staff will need to be trained — the initial cost per good chip could be over £100. That is, unless the NEB defers a pay-back on the investment or writes it off.

Research and development costs inevitably require considerable elasticity, and long-term funding in this area must be an item for consideration by the NEB and the group of engineers behind the company.

Given the £50 million total budget, it seems certain that much of the initial R&D will already have been done.

From this it follows that much necessary to manufacture the memories will be imported from the US, even though the NEB feels this is unlikely. American companies use American equipment.

Such a sum would be split between establishing a wafer-fabrication facility capable of producing the 64K RAMs the company will be making — estimated at between £14 million and £17 million, assembly and test equipment, and research and development. These last items are difficult to forecast.

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## Tim Palmer reports on the latest developments from Wang in the US

Starting off in scientific calculators, Wong Laboratories has grown fast by moving into the low-cost small business and word processing markets. A \$200 million company today, Wang has ambitions to hit the \$1,000 million mark by the mid-1980s and is gambling on a powerful new product, the 2200 VS small mainframe to carry it there. Tim Palmer reports from corporate headquarters in Lowell, Massachusetts.

# The hungrier firm that aims for \$1,000 million sales

THE hungrier computer company. That's what Wang calls itself. And that hunger manifests itself in a number of ways, notably a hunger to get its name as well known as that of IBM. This is not without reason, because Wang's achievements in the computer industry have gone too much unnoticed.

But while the world at large has been looking the other way, Wang's customers have shown a loyalty to the company and its products which has carried it from an \$8.8 million company in 1966-67 to \$134 million in 1976-77.

This year is confidently forecast to outstrip all previous years, with turnover for the year to June 30, 1978, topping the \$200 million mark, which would make founder and President Dr An Wang's target of \$1,000 million by the mid-1980s look eminently reachable.

Wang is not, however, playing safe and relying on its well-tried product line for continued success. Instead, last October it embarked on the biggest gamble in its history: a direct challenge to IBM in the small mainframe market. The vehicle for this challenge is a new machine which takes the approach that IBM is expected to follow in its forthcoming ES-series.

Although designated the 2200 VS, the new system has a completely new processor, and has little in common with the other systems in the Wang product line, the 2200T, VP and MVP.

It is designed for transaction processing, and has an instruction set compatible with that of the IBM 360 and 370. Most of the instructions are the same as IBM, a few scientific ones have been omitted and a few have been altered.

Wang is pinning its faith on the new VS machine, and already some 25-30 have been installed with customers, the largest of these supporting 21 concurrent terminal users.

The VS had its European debut at the Hanover Fair, is due to be launched in the UK at the beginning of July, and will also appear in Sicob in Paris.

Wang is very strong in the US small business systems market, defined as covering the IBM 5160, 5110, System 32 and System 34. One research organisation gives it number two position to IBM with 22% compared with IBM's 28%.

Nevertheless the company does 43% of its business outside the US and this 43% is broken down to 30% in Europe, with the remainder in the Middle East. "In the Middle East we sell



**Why WP system has no CPU**

PERHAPS the most noteworthy feature of the Wang word processing system is that it has no central processing unit. Instead, it takes the concept of distributed processing to its logical conclusion by distributing all the intelligence through the elements of the system, so that for example the basic WP10A stand-alone system includes Intel 8080s in the video terminal, the dual floppy disc unit and the printer. The line is exceptionally easy to upgrade, being simply a set of 8080-based peripheral modules. The WP20 takes up to three workstations and three printers, the WP25 adds hard discs of 1.5, 2.5 or 5 Megabytes and the WP30 has 10 Megabyte disc and supports up to 14 peripherals.

As with the VS, the WP systems include 16 function keys and the processor is interrupt-driven from the work station. Detailed prompts and menus from which the desired operation is selected. Automatic document indexing and compilation of document statistics is supported, and the latest release of the software supports variable letter spacing.

Additional peripherals supported include optical character recognition, photo-composition and intelligent copiers.

At present only one floppy disc terminal is supported, but local floppies at each terminal are to be introduced. "We program in PL/M and an assembler, and compilation takes four to five minutes on a native machine," said Harold Koplow, head of word processing research and development at Wang.

"We have a distribution facility at Erpe-Mere, just outside Brussels, and we manufacture printer mechanisms in Taiwan," he added.

Almost all Wang's manufacturing is done in Massachusetts, and as well as its own processors and video terminals, it builds an extensive range of text printers, a drum plotter and graphics display and is just moving into daisy wheel printers. So far, none of the peripherals has been sold on OEM basis, the company's full production being required for sale with its own systems.

Although Wang started out in the scientific calculator market, the commercial side is fast taking over and now represents 60% of the business. Dr. Wang remains very much in control of the company, and he and his immediate family own 83% of the shares.

He is the butt of affectionate jokes from his employees, not least for the new open-plan layout which is a honeycomb of small offices separated by partitions just too high to see over.

"Any similarity to a Chinese maze, a purely occidental," laughs Harry Viers, director of marketing communications.

Wang's word processing systems development centre at Lowell, Massachusetts.



## Architecture changes for virtual processor

THE new virtual 2200 VS processor from Wang marks a major departure for the company, taking it way up-market from its traditional business in the \$10,000 to \$80,000 segment.

Due for UK launch in July, the 2200 VS processor is completely different from the 2200 T and VP systems. The T is built around a Basic interpreter and has no operating system as such. It has a 24 bit microcode, 4 bit direct path and 8 bit fetch from memory. The VP, and its multi-processing MVP variant, have the same 24 bit microcode, an 8 bit direct path and a 16 bit fetch from memory.

One thing at least the VS has in common with its predecessors: an unconventional architecture.

"Internally the VS has a 16 bit architecture, with an additional six bits of error correction code, but externally in the programmer it is a 32 bit machine," said Peter McElroy, product manager, large computer systems.

The operating system is interactive, with copious prompts to the user. "It has a VS-like indexed access method, the main difference being that IBM splits blocks on overflow, where we create new blocks."

"The file management system supports an unusual record format compression which in one example compressed 34 Megabytes into 32 Megabytes. Decompression is handled by the input-output processor."

The interactive keyboard includes 16 two-function keys and the processor is interrupt-driven from the work station. Detailed prompts and menus from which the desired operation is selected. Automatic document indexing and compilation of document statistics is supported, and the latest release of the software supports variable letter spacing.

Additional peripherals supported include optical character recognition, photo-composition and intelligent copiers.

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By JOHN GARRETT



Third prize in the Computer Weekly/Dataskill essay competition, Computer-style 2000, was awarded to John Garrett (left) of Computer Systems International, of London WC2. When he submitted his en-

try, Garrett was a project leader with the company, but has now been promoted to project manager with Computer Systems International, of London WC2. His prize-winning essay appears below. The entries by John Finnie of Solihull, Paul Holden of Dublin and Tony Thornton of Derby, which have won special awards, will be published in Computer Weekly in the near future.

# By the year 2000—a divided society based on nineteenth century ideas

It is far easier to look back on technical change than look forward. Looking back we can see that part of our history, and are able to identify social and economic processes that caused one technology to develop, and another to fail.

Looking forward, particularly in a world as politically fluid as our own, with people's aspirations so varied, is a lot more difficult. Yet within the world makes of the two, and only two, great technologies developed by the computer industry will be decided by the social ideas and economic forces that will gain prominence.

The two technologies, which I take to be digital information (memory) and machine intelligence (processing), have been refined over a period of 20 years, to such a degree that:

1 All kinds of information, from music to X-ray pictures, to an individual's complete life history, can be digitally recorded, thus making all known data capable of being processed by computer, and being rapidly and universally communicated.

2 Machine intelligence is now cheap enough to be applied to a huge and still-growing range of decision-making activities that could previously only be performed by humans, or more interestingly, were beyond human scope altogether.

These have been many other innovations in the computer industry, aside from memory and processing, but they all are only uses and developments of these two technologies, and as such are primarily responses to commercial and other social pressures.

Stuart Berr described this system which he developed for the Allende government in Chile as a "system of here-and-now management of the economy that is now based on historical records, but on an immediate awareness of the state of affairs and the projection of that awareness into the short-term future."

The advances of computer and communications technology are thus relevant to many different groups and interests in society. How, in practice, they will be used has very little to do with the creators of computer systems—their work has been done. The hardware and software designers have performed the role undertaken by the Guild craftsmen before the

employed, national governments will be mostly left-leaving, but recognising their dependence on the multi-nationals, may be somewhat ineffectual. Governments will seek to control industry by increasingly strict environmental and safety practices. In practice, these regulations will exclude all the large corporations from pro-

The hardware and software designers have created the tools of a new age.

ducing sophisticated manufactured goods, and will provide the main spur to technical and market innovation in place of an increasingly disinterested consumer.

In a world still based on the work ethic, the unemployed, lacking the political and economic power enjoyed by workers, will be very alienated.

Office, laboratory and design-room work will be based on multi-purpose workstations, consisting of processor, master data entry device and interfaces for all kinds of communications and peripheral devices. A vast range of sense and display devices, often with their own processor and control software, will then be available. In the office, speech digitisers and document reader/writers will be common. In the laboratory and design-room, software will have developed to display and manipulate digitally-held representations of all types of matter and energy. To achieve this, graphics software will have become a large and industry in the first time in human history.

Computers, fortunately, are not all on the side of the big battalions—the emergence of the microprocessor has seen to that. Personal computing is unlikely to be content for long with housekeeping jobs and TV games. The use of microprocessors in numerical control machines gives a small engineering concern a vastly increased scope for producing a wide variety of components from relatively few machines. Craft skills such as embroidery or pottery could be enhanced by use of micro-controlled sewing machines or pottery wheels.

The most inappropriate of these nineteenth century ideas in the year 2000 is a very divided society, created by the introduction of computer technology and automation in general, into a society based on nineteenth century ideas. Those in work will still be expected to work hard, and be committed to the corporation for which they work, and by present standards they will be generously rewarded.

The alternative movement which started in the US in the 1960s could well have developed enormously. People who could no longer obtain identity from a job will eagerly seek land. With little point in living in jobsites, there could well be a drift back to new communities in the country, thus reversing the direction of the last industrial revolution.

What we are then likely to see in the year 2000 is a very divided society, created by the introduction of computer technology and automation in general, into a society based on nineteenth century ideas. Those in work will still be expected to work hard, and be committed to the corporation for which they work, and by present standards they will be generously rewarded.

They will still be dependent on support on the main

and will increasingly develop their own institutions to

the new working class in the eighteenth and nineteenth cen-



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By the year 2000, factory and office automation, increasingly computer-controlled, will have stopped producing mainframes, the larger seeking to dominate the huge workstation and communication market, with the smaller custom building specialised machines out of arrays of small processors.

Computer technology has something for everybody, and all kinds of people will seek to use it for all kinds of purposes. The use of microprocessors in numerical control machines gives a small engineering concern a vastly increased scope for producing a wide variety of components from relatively few machines.

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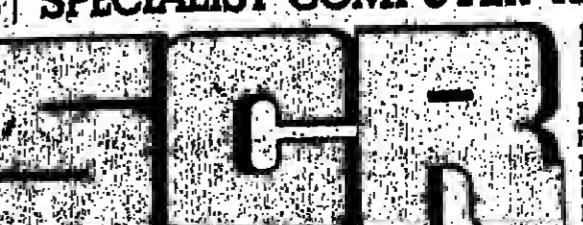
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A small but extremely busy software house, specialising in the provision of turnkey systems to the legal and general commercial worlds, has vacancies for experienced RPGII programmers who either hold Senior Programmer positions or who have reached the point where they feel able to do so. Additionally, applicants must be equal to the challenge of working on a variety of MINI's and MICRO's for which training will be given where necessary, and of developing a variety of systems and applications on-site at locations throughout the London area. Salaries are negotiable according to experience and ability.

Contact: Andy Wright

**Field and Support Engineers**

All areas

Several of our clients, mainly mini-computer suppliers or manufacturers, seek good experienced field and/or support Engineers. Generally, the work involves dealing with a variety of problems associated with hardware and diagnostic software. In some cases training will be provided during the early stages. Candidates must be able to demonstrate a sound systems approach to their work and be capable of dealing with people of all levels. The positions offer excellent remuneration packages, career prospects, and work involvement. Applicants are invited to call and discuss their requirements and aspirations.

Contact: Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

**JAMES BAKER ASSOCIATES, International Personnel Consultants**  
16 Maddox Street, London W1. Tel: 01-491 4478

**PROGRAMMER/ANALYSTS**

**A**RE YOU INTERESTED IN FUTURE CAREER DEVELOPMENT?

**I**F YOU ARE CAPABLE OF EARNING £5,000 to £6,000 PER YEAR AND HAVE

**R**PG2 EXPERIENCE AND ICL 2903 SOFTWARE BACKGROUND

**C**OULD YOU WORK IN A SMALL ESTABLISHED TEAM? WITH

**A**BILITY TO WORK ON YOUR OWN INITIATIVE?

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We are a major International company providing Car Phone, Pocket Sleeper and Medical Deputising services throughout the UK and overseas.

Our present 2903 with EDS30s will shortly be enhanced to 40K 2904 with 800 lpm printer and VDU's. Future plans include an independent computer division.

This is an ideal opportunity for career development and to make a positive contribution to the pension scheme and further training into online databases and new languages.

Please phone:

Jim Callis

Systems &amp; Programming Manager

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Phone 01-834 0524, ext. 1009

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# IBM OPERATIONS STAFF

**Luton** £3900-£5200

Our client is an International company with a large and expanding IBM installation in Luton.

The installation is technically advanced and includes a large 370 mainframe running OS/VSI with database and interactive program test software. Batch day, excluding weekends.

All overtime is paid for at premium rates, there is a subsidised restaurant and the company will help with relocation costs where appropriate.

### Computer Operators £3900-£5200 inc.

This is an opportunity to broaden your experience. And with the planned growth, your promotion prospects could be very good indeed. You must have at least 12 months' IBM experience, preferably in a large installation and should have accepted three-shift working as a way of life.

### Operations Analyst £4200-£5200

This is a non-shift position reporting to the Head of Operations Support. The work is varied and interesting. For example, writing JCL to improve the effectiveness of systems from an operating viewpoint. Taking responsibility for library maintenance. And providing operations support during the implementation of new systems.

You must have previous IBM operating experience over a period of at least three years.

To apply for these positions please telephone Sylvia Walton or write to:

**Castle Computer Services Limited**  
27 High Street, Buntingford, Herts. IBM Phone: (0427) 73151.

**Analyst/Programmer**

London SE1

Continuing expansion of this successful bureau has created an urgent requirement for an experienced analyst/programmer to join their small and highly skilled development team. Applicants should have a minimum of 18 months' COBOL experience on UNIVAC 100 equipment, but most of the work involves new development on PDP 11/35's using BASIC 4, for which full training will be given. Opportunities for Project Management could come quickly to those able to learn fast and possessing the necessary drive. Salary progression will be rapid if you can really match the demands of this job.

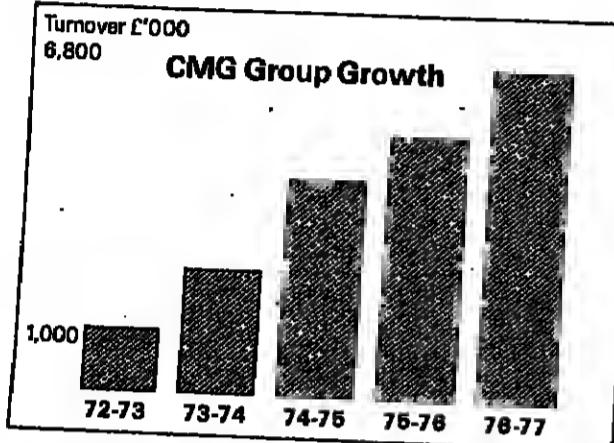
Contact: Andy Wright

£7,000 + car

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CMG's growth during the past 14 years has been remarkable. It now has offices in six European locations and a turnover in 1977/78 of more than £8.5 million.



Organisations use CMG's computer consultancy services to obtain answers to four main questions:

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Our consultants are often involved in implementing systems for our clients on our computers as well as on our clients' own machines.

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Janet Gothard, CMG (West End) Ltd., Sunley House, Bedford Park, Croydon CR0 2AP. Tel: 01-686 8281. (TO BE RELOCATED IN LONDON)

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SURNAM.

FIRST NAMES

TELEPHONE Nos. HOME

OFFICE/CONTACT

DATE OF BIRTH

MARITAL STATUS

NATIONALITY

DO YOU HAVE A CURRENT DRIVING LICENCE?

PASSPORT?

DO YOU OWN A CAR?

ARE YOU PREPARED TO TRAVEL FOR SHORT PERIODS

UK?

ABROAD?

DESCRIBE THE APPOINTMENT YOU NOW SEEK:

#### DETAILS OF EDUCATION

SCHOOL CARLIER

EXAMINATION RESULTS (subjects and dates)

HIGHER EDUCATION

EXAMINATION RESULTS (courses and dates)

#### CAREER HISTORY

##### PRESENT OR MOST RECENT EMPLOYMENT

NAME OF COMPANY

JOINING DATE

JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

##### PREVIOUS EMPLOYMENT

NAME OF COMPANY

JOINING DATE

JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

##### PREVIOUS EMPLOYMENT

NAME OF COMPANY

JOINING DATE

JOINING SALARY £

CURRENT SALARY £

POSITIONS HELD (approx. dates) and DUTIES SPECIFYING COMPUTERS USED AND AREAS OF BUSINESS KNOWLEDGE:

#### OTHER INFORMATION -

LEISURE, COMMUNITY ACTIVITIES, etc.

ANYTHING ELSE YOU WOULD LIKE TO ADD:

SIGNATURE

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A LEADING FIRM OF CONSULTANTS WOULD LIKE TO HEAR FROM CONTRACTORS FOR MAJOR DEVELOPMENT PROJECTS THROUGHOUT LONDON - SOUTH EAST - WILTSHIRE - BUCKS - ESSEX - MANCHESTER - BIRMINGHAM - COVENTRY -

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Suffolk	to £7K
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Barks.	to £8.5K
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Surrey	to £7K
W1	to £4.5K
E4	to £5K + Benefit
Berks.	to £7K +
WC2	to £6K
N.W. London	to £7.5K
Leics.	to £5.8K
City	to £6.25K
Essex	to £6.5K
Herts.	to £6.5K
City	to £6.5K
SE1	£Neg.
WC2	£Neg.

Contact: MARILYN DAVIDSON



Emp. Agency Ad/ Licence SE(A) 2646

## Computer Operators

Salary range £4,000-£4,440 p.a.

**FREE TRAVEL on London Transport Services,  
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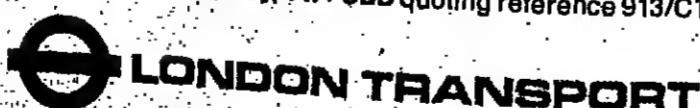
Our rapidly expanding Data Processing Department is closely involved in supporting the services operated by one of the largest urban passenger transport organisations in the world.

We can, therefore, offer an interesting and varied work mix made up of intensive batch and teleprocessing systems on ICL and IBM mainframes.

We require Computer Operators (3 Shift) with at least 18 months experience of either George 3 or OS/VS1 to work in our large installation near Oxford Circus.

The configuration currently includes two ICL 1904S and an IBM 370/148 and distributed processing through on-line networks and mini-computers.

If you are looking for wider experience, career development and excellent promotion prospects then **APPLY NOW** by phoning the Senior Operations Controller on 01-637 9144. Otherwise write to the Staff Appointments and Development Officer, 58 Broadway, SW1 QBD quoting reference 913/C1.



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MIDLAND PDP II host + Programmers £5,000 + plus new company car. (Or freelance contract if preferred)  
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Write to: MICHAEL LUDLAM & ASSOC. BESOM HOUSE, HOLYMOORSIDE, CHESTERFIELD, Telephone: 0246 29298 anytime.

We would have thought they'd relish the chance to work on equipment which is at least as big as they are. For instance, an IBM 360/50 with a megabyte of core operating under OS, MVT and HASP with access to three IBM 370/158s operating under MVS/JES2 with TSO, CICS and VSPC. We were puzzled and took our aggression out on the tea lady. She didn't flinch. A steadier hand has never poured tea. Raising a world weary eyebrow as steam cascaded around her, she ad-libbed quickly. 'I have you advertised?' she asked. 'Takes the cake doesn't she?'

**Senior Programmer - up to £7,500 p.a.**

With an in-depth knowledge of COBOL, together with an understanding of OS/CL. Up to 4 years' experience of IBM equipment required, together with some experience of controlling junior staff.

**Senior Analyst/Programmer - up to £7,000 p.a.**

We need a graduate with preferably 1 years' FORTRAN experience gained in an engineering environment. Training will be given on IBM equipment where necessary.

**Programmer - up to £6,000 p.a.**

With a minimum of two years' experience of COBOL together with a working knowledge of OS/CL and utilities.

**Graduate Programmers - £3,600 p.a.**

We also need graduate Engineers with up to one year's FORTRAN experience. Training will be given on IBM equipment where necessary.

Pullman Kellogg are one of the world's leading petrochemical contractors. The very nature of our work means that our Computer Staff are assigned original, diverse and challenging tasks.

Staff benefits, salaries, overtime opportunities and promotion projects are all good, and assistance with relocation where necessary will be given. Now that we've told you, you can't complain - you didn't know.

**IF COMPUTER PERSONNEL ARE AS BIG AS THEY ARE, INK THEY ARE HOW CO RD TO SEE?**

If you are big enough, dial 01-903 8484 and speak to us about our equally big opportunities. We will be able to arrange an early interview.

Call anytime between 9 a.m. and 7 p.m. on Friday 23rd June, Monday 26th June or Tuesday 27th June. Ask for

John Staerck on extension 3850 for the Senior Analyst and Graduate Programmer positions and Ian Kydd on extension 3865 for the Senior Programmer and Programmer positions.

If you are unable to make any of these times please call John Nicholas on extension 3159 in our Personnel Department.

**Pullman Kellogg Limited,**  
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For further details contact:  
SALES & MARKETING DEPARTMENT



## Communicate with Racal

Racal-Milgo Limited is a wholly owned subsidiary of the Racal Electronics Group of Companies and specialising as leader in the field of Data Communications Equipment, have a requirement for a Regional Sales Manager to be based in the Northern Regional Office on the south side of Manchester.

The person (Male/Female) will be expected to control areas of the Company's business in an area north of the Midlands and will be directly responsible to the UK Sales Manager for the continuing business success in this area.

The successful person will probably possess a Degree or equivalent qualification and have experience in a technical sales environment. Experience in data processing or a computer related field is highly desirable. Proven field sales management experience is essential.

A basic salary commensurate with the responsibility of the position will be paid. A company car will be provided and the person will participate in a commission scheme.

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Write with details of age, experience and current earnings to:-

D. J. Kitchenside,  
Personnel Officer,  
Racal-Milgo Ltd.,  
Prospect House,  
Thorn Street, Reading, Berks.

## Regional Sales Manager (North) Data Communications

**RACAL**

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COUNTY ENGINEER'S  
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**SENIOR PROGRAMMER**  
£3862/£5112 including supplements  
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AN OPPORTUNITY FOR SOMEONE WITH EXPERIENCE OF A MAJOR ROLE IN THE CONTROL SOFTWARE TO ENJOY

A MAJOR ROLE IN THE GREATER MANCHESTER URBAN TRAFFIC CONTROL SCHEME.

The Urban Traffic Control System Group is due to have a traffic control computer system, using four Ferranti Argus 700 S computers installed at the end of 1978. The part up to the acceptance of this system, will be used to ensure that the software is rigorously tested before commencing on-line operation. Commissioning of the system will commence on-line traffic signals over most of the area of the County will follow. The Group now needs a Senior Programmer initially to work alongside the contractor to fit in the software integration testing of the system. Subsequently, he/she will be initially involved in commissioning the operational system on-line. Substantial further development of the system will follow.

For the first 6-8 months, the person appointed will work at the contractor's facility at Wythenshawe, on delivery of the computer system. The person will move into the UTC computer centre in the centre of Manchester adjacent to County Hall.

Alternative conditions of service include remotal, legal, six hours, staff restaurant.

Applications by letter, stating full details (including qualifications, experience, age, salary, and names and addresses of two referees) to the County Personnel Officer, County Hall, Wythenshawe, Manchester, M20 3HP by 3rd July 1978.

Application form and Job Description available from Chief Personnel Officer, 14/16 Church Road, Ashford, Kent, Tel: Ashford 24411 ext. 230.

**ASHFORD  
BOROUGH COUNCIL  
TREASURER'S DEPARTMENT**  
**Computer  
Operations  
Supervisor**

required - Grade AP3/4  
Salary: £3395 to £4214 (including salary supplements)

This is a Joint Computer Unit, operated by Ashford Borough Council and Shepway District Council, which is located at Ashford with ICL 2903 computer.

The job purpose is to control the day-to-day operations in the Computer Unit and to ensure prompt production of scheduled work. Duties include supervision and training of operations staff and controlling and scheduling of work to ensure the maximum use of the computer.

Excellent conditions of service include in appropriate cases:

Commuting housing if required  
Removal expenses  
Sitting in allowance of up to £100.

Assistance with professional fees in sole and house purchase up to £200.  
Post entry training facilities available.

Closing date - 13th July 1978.

Application form and Job Description available from Chief Personnel Officer, 14/16 Church Road, Ashford, Kent, Tel: Ashford 24411 ext. 230.

Systems Engineers  
Systems Designers  
Project Leaders  
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Systems Managers

Up to £10K  
Consultancy Line Management

This advertisement is addressed to Systems Engineers, Systems Designers, Project Leaders, Systems and DP Managers because most of our senior people left positions such as these to join us. We are still expanding rapidly and we do not run full staffed between 25% and 30% to inform our clients. We are in particular looking for people with industrial business systems experience in the Insurance, Manufacturing, Distribution and Transportation industries. We are also looking for people with specialist skills in transaction-based systems, data base for finance, terminal models and communication networks.

As a consultant you will be required to undertake a variety of different assignments. You will certainly need to manage projects and will learn the unique Hoskyns systems based approach to the management and control of computer projects. As a manager you will have full responsibility for keeping projects to schedule, within budget, and above all for producing consistently high quality work for our clients. When necessary you will be trained in new techniques and developments.

Once you have proved your ability as a consultant, there are several different directions in which you could move. For example, you could become a Senior Consultant, responsible for major projects, a Project Manager, responsible for a number of consultancy and systems development projects, or you could take advantage of opportunities in other divisions of the Hoskyns Group, both in the U.K. and overseas. Hoskyns is part of an international group with sales in excess of £100 million.

If you would like to know more about the opportunities at Hoskyns, please send us a curriculum

vitae or write or phone for an application form to:  
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91-93 Farringdon Road, London EC1M 3LE.  
Telephone: 01-242 1951

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## Computer Technologist

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Preece, Cardew & Rider are consulting engineers responsible for major projects both in the U.K. and overseas.

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Computer-assisted operation and maintenance of long distance circuits, including real-time data retrieval and complex systems of selective data logging.

Computer support for emergency services' control rooms.

Automatic accounting for long distance telephone and telex calls (toll-ticketing).

Conventional payroll and stock control systems.

The applicant should have several years' experience of hardware capability and software design directly relevant to the above and, most important, an ability to identify and analyse functional problems and communicate fluently. Some travel abroad will be necessary to liaise with clients, accept systems and advise on future applications and enhancements. Formal qualifications are desirable but not essential.

We offer an attractive starting salary and a full range of benefits — including generous overseas allowances and relocation assistance to this pleasant South Coast area as necessary.

Write in confidence for details giving concise history to:

The Personnel Manager, PCR Service Company,  
Preston House, 165-167 Preston Road,  
Brighton BN1 6AF.  
Tel: Brighton 507131.

Closing date - 13th July 1978.

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**ANALYST/PROG** **HOLLAND**  
Our client, a major organisation meeting the ground power needs of world's airlines, by engineers, a broad range of products to clients in more than 100 nations. Retaining Honeywell G2/40 under OS/VS. Co. offers 2-3 years' COBOL experience. Co. offers

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- \* Late of user liaison
- \* Variety of interesting applications with Honeywell IMS package
- \* Excellent fringe benefits
- \* Salary DFL 42-48,000 (£12,000)

Ref. 1538

**SNR PROGRAMMER** **HOLLAND**  
Our client, a major company based in Holland, is engaged in the supplying of loudspeakers. They are seeking a Systems Analyst with at least 4 yrs' COBOL experience. Applications include production control and accounting. They retain IBM 370 115 under OS/VS. Co. offers

- \* Possibilities of travel throughout the Netherlands
- \* Relocation expenses
- \* English-speaking environment
- \* Excellent career prospects
- \* Salary to DFL 42,000 (£12,000)

Ref. 1547

**PL/I PROGRAMMERS** **HOLLAND**  
Our client, a major and successful concern, wishes to strengthen its European programming team. Retaining IBM 370 hardware under OS/VS. Co. seeks ambitious person with PL/I CICS or COBOL an asset. Co. offers

- \* Involvement in development of new projects
- \* Opportunity to work with an expanding organisation operating world wide
- \* Centrally based — Amsterdam
- \* Salary 40,000 Guilders (£10,000) cost of living allowance and relocation expenses

Ref. 1212

**SYSTEMS ANALYST** **HOLLAND**  
International company engaged in manufacturing distribution and sales of well-known commercial products, requires person with experience of material inventory, stock control, warehousing or sales forecasting systems. Successful candidate will form the company's distribution project and will be responsible for management information reporting. Company offers

- \* Excellent opportunity for career progression.
- \* Relocation expenses
- \* Company uses Siemens equipment comparable to IBM 370
- \* Salary to 60,000 DFL (£15,000) + Bonus.

Ref. 1585

**SYSTEMS ENGINEER** **W. GERMANY**  
Our client, an American publishing company, has vacancies for programmers with at least 3 years' COBOL experience. The company retains IBM 370 hardware and the successful applicant will be involved in a variety of commercial applications. Co. offers

- \* Beautiful offices in a pleasant part of Amsterdam
- \* Opportunity to work in an expanding world-wide organisation
- \* Good career prospects
- \* English-speaking environment
- \* Salary 40,000 Guilders (£10,000)

Ref. 1803

**SNR ANALYST/PROGRAMMER** **DUTCH/SEIGMUS BORDER**  
European division of American manufacturing co. seeks potential EDP Manager with personality, drive and enthusiasm for their PL/I installation. Applicant should have substantial amount of years in systems analysis and programming on PL/I with a good working knowledge of MUMPS. He/she will be involved in design and implementation of commercial and statistical systems integrated databases.

- \* Excellent growth potential
- \* Generous fringe benefits
- \* Salary to DFL 80,000 (£15,000)

Ref. 1578

**ANALYST PROG** **HOLLAND**  
Our client, an international engineering company retaining IBM 370 hardware seeks an analyst programmer with minimum 3 years' COBOL experience. CICS VS would be an advantage. Company is situated in an historical University town close to Dutch/German border. Company offers

- \* Relocation expenses
- \* Good career prospects in this company with excellent growth potential
- \* Generous fringe benefits
- \* Salary to DFL 80,000 (£15,000) + Bonus.

Ref. 1473

**SYSTEMS & PROGRAMMING**

**SWEDEN & GERMANY**  
Overseas division of major international company have various systems and programming assignments available in SWEDEN and GERMANY. Applicants must speak German or Swedish and have 3/4 years' COBOL/PL/I exp. on ICL equipment.

- \* Variety of interesting and exciting projects
- \* On-line applications
- \* Use of DRIVER
- \* Communications and management
- \* Salaries Excellent — depending on location

Ref. 1589

**PROGRAMMERS** **MIDDLE EAST COUNTRIES**  
Our client is a major international organisation with offices throughout the world. They seek programmers and analysts in BAHRAM & JEDDAH where their market is growing strongly. Ideal applicants will have COBOL and/or NEAT experience on NCR mainframe business machines to work on an interesting variety of projects in a financial and commercial environment.

- \* Scope in a variety of areas
- \* Prestige company
- \* Accommodation and expenses paid by company
- \* Renewable assignments
- \* Salary £12,000 c. TAX FREE

Ref. 1589

**PROGRAMMER** **SELOUM**  
Our client is a major organisation providing comprehensive marine engineering and construction services to companies engaged in Hydrocarbon development. Retaining IBM 370 under OS/VS. Co. seeks a person with PL/I, RPG or ASSEMBLER an asset. Company offers:

- \* Variety of projects in rapidly expanding company
- \* Completely based — BRUSSELS
- \* English speaking environment
- \* Settling in allowance for married or single persons
- \* Salary approx £18,000 p.a.

Ref. 1447

For further details telephone or write to our London Office: 01-734 0152/3010 (24 hrs.)

# CONTRACT

## OVERSEAS CONTRACTS

**ANALYST/PROG PL/I RPG DL/I**  
**BURROUGHS OMS PROGS**  
**IBM CICS COBOL QS/VS**  
**IBM CICS COBOL DDS/VS**  
**HONEYWELL G. MAP**  
**UNIVAC OMS**  
**DATA GRAPHICS SPECIALIST**

Holland

£400 p.w.

**IMS DL/I PROGS**  
**IBM COBOL DL/I OS PROGS**  
**IBM DL/I ANALYST**  
**IBM PL/I DDS/VS PROGS**  
**IBM CICS ASSEM**  
**IBM CICS ASSEM DESIGNERS/PROGRAMMERS**  
**IBM RPGII DDS/VS PROG**  
**BURROUGHS 3700 COBOL PROG**  
**BURROUGHS SPECIALIST CONSULTANT**  
**ICL GII COBOL**  
**PDPI MACRO II PROGS**

Holland

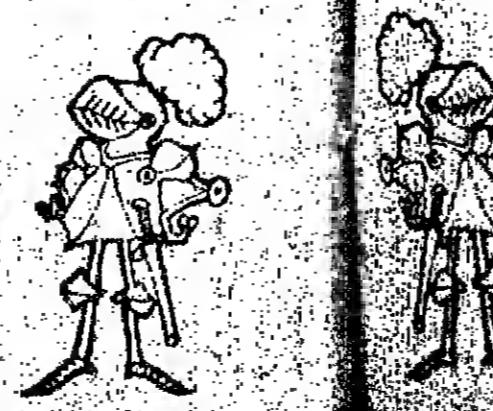
£400 p.w.

Phone now for immediate and future contracts  
Ring Christine Kay/ David Hayton 734 0152 (24 hrs.)

## KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON W1. TELEPHONE 01-734 0152/6 (24 HOURS)  
OFFICES: AMSTERDAM, PARIS, MANCHESTER

Computing Services Association



## KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON W1. TELEPHONE 01-734 0152/6 (24 HOURS)

OFFICES: AMSTERDAM, PARIS, MANCHESTER

For immediate and future requirements telephone:  
061-833 9341 (Manchester) or 021-236 1794, Ext.  
223 (Birmingham) or write to Perry Butler, 520 Royal  
Exchange, Manchester, M2.

**SYSTEMS ANALYST**

**LONDON**

Our client, a prestigious Merchant Bankers are seeking a Systems Analyst who has financial banking environment experience. They retain IBM 370 under OS/VS. Co. offers

- \* TRAINING in PL/I and ICL
- \* Development work on new sophisticated systems
- \* Good progression with inward thinkers
- \* Salary £14,500

Ref. 1504

**JNR PROGS**

**LONDON**

Challenging areas needs persons with approx 12 months' programming experience on ANY MACHINE. ANY LANGUAGE with drive and enthusiasm who wants to follow a positive career path. Opportunities as follows:

- \* TRAINING in PL/I and ICL
- \* Full banking benefits including subsidised mortgage
- \* Excellent working environment
- \* Job security with prestige company
- \* Salary £7,500

Ref. 1550

**PL/I PROGRAMMER** **W. LONDON AREAS**

As part of a prestige international group of companies, our client is recruiting for programmers with 2/3 years' PL/I exp. and interest in manufacturing systems on the IBM Series/1 mini computer.

- \* Excellent opportunity to be trained on mini computer
- \* Versatility of IBM Series/1 in relation to IBM mainframe
- \* Working with up-to-date technology
- \* Excellent career opportunities including chance of working with microcomputers
- \* Salary £6,000-£10,000 p.a.

Ref. 1478

**MINI PROGS**

**LONDON HOME COUNTIES**

Prestige company based in USA, Europe and UK are recruiting persons at varying levels (from progs to systems specialists) for their new city offices. Having large OEC PDP equipment they seek people with experience on any MINI but using ASSEMBLER. Co. offers

- \* Extensive training up-to-date technology
- \* Excellent career opportunities
- \* Training in RSX, RTII and RSTS
- \* Chance to travel abroad
- \* Salary £6,000-£10,000 p.a.

Ref. 1478

**ICL PROGS**

**LONDON**

Due to development of their advanced computer systems, successful O.P. services dept. seeks to build its programming team. Retaining large ICL 1900 equipment they offer excellent opportunities for persons with minimum 2 years' ICL COBOL experience. Co. offers

- \* Opportunity to join senior level
- \* Training in IOMS database
- \* Development to analysis
- \* Applications in various areas providing an absorbing and interesting career
- \* Excellent perks include flexi hours and 5 WEEKS' HOLIDAY
- \* Salary £5,500

Ref. 1548

**JUNIOR PROG** **LONDON**

**WEST LONDON, BERKS**

International company with outstanding reputation for efficiency, growth and investment are seeking senior analysts/programmers to work within IBM 370 installation. Good experience of PL/I or COBOL or ASSEMBLER is essential together with ability to work on own initiative and supervisory staff. Working on teleprocessing and time-sharing systems with opportunity to work on small business machines, co. offers:

- \* Exciting growth potential
- \* Excellent promotional prospects
- \* Non-contributory life assurance, sickness and pension scheme
- \* Good working conditions
- \* Salary to £6,000

Ref. 1568

**SENIOR ANALYSTS**

**MIDX**

Our client, a major organisation, situated close to both M4 and M2 motorways, is seeking a senior analyst to act as PROJECT MANAGER on a wide range of applications. If you have approx 1 years' systems experience preferably in ICL 1900 series environment, and are able to demonstrate a professional approach to project management apply now. Co. offers

- \* Job security with a prestige concern
- \* Subsidised lunch, pension scheme plus other company benefits
- \* Responsibility
- \* Excellent working conditions
- \* FREE lunches, FREE life assurance
- \* Salary £8,500 + COMPANY CAR

Ref. 1529

**MINI PROGS**

**HANTS**

Our client is a major British company with business interests in many areas. They seek programmers with at least 18 months' DEC PDP and BASIC+ experience. This hardware is newly installed and thus offers a chance to become involved in the development from the beginning. Co. offers:

- \* Wide range of projects
- \* FLEXI HOURS
- \* Excellent career prospects
- \* SPORTS AND SOCIAL CLUB
- \* ANNUAL BONUS
- \* Salary to £6,000

Ref. 1588

For further details telephone or write to our London Office: 01-734 0152/3010 (24 hrs.)

# CONTRACT

## MIDLANDS AND NORTH ENGLAND

**POP/II RSTS**

**IBM DESIGNERS DB/DC**

**SYS/4 PROGRAMMER**

**IBM OS COBOL (to work on 3033s)**

**IBM OS ASSEMBLER**

**IBM MK IV/COBOL**

**IBM DOS VS PL/I**

**IBM CICS VS DL/I**

**IBM DOS VS COBOL**

**PL/I CICS**

**Liverpool**

**Midlands**

**N. England**

**N.W. England**

**Midlands**

**N. England**

**Midlands**

**Surrey**

# MYRIAD OPERATIONS

Computer Personnel Consultants

## OPERATIONS CONTROLLER

EAST LONDON

c. £6,250

Our Client, a major engineering concern with a reputation for export achievement have recently installed an IBM 370/138 in order to cope with the increased demand for computer services within their organisation.

The expansion of these services create the need to appoint an Operations Controller who will take overall responsibility for:

- \* Operations
- \* Data Control
- \* Data Preparation

The person appointed will report to the Data Centre Manager and will be responsible for the establishment of fourteen.

We would expect suitable candidates to have fulfilled a similar role or to have progressed through data control and operations to attain supervisory level. A sound knowledge of IBM hardware and utilities will be required, the installation runs under DOS VS with POWER and supports a teleprocessing network using SHADOW.

Salary for the position will be negotiable in the region of £6,250 and will be supported by a comprehensive benefits package.

Reference E3/2206.

24-hour answering service  
Please telephone for a confidential discussion or write:  
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01-353 0981

CPC / United Kingdom.

The consumer division of CPC (United Kingdom) Ltd., Pelsley, part of a multi-national operation manufacturing Knorr, Brown & Polson, Gerber, Hellmann's and Frank Cooper products wishes to appoint:

## SYSTEMS DEVELOPMENT STAFF

West of Scotland

The Systems/Data Processing Department is responsible for the investigation, preparation and implementation of systems and procedures for manual and computerised applications. A wide range of projects ensures that the work is challenging and rewarding. In particular the department is currently concerned with the installation of on-line VDU systems related to the imminent installation of a DIGITAL EQUIPMENT COMPANY PDP 11/60. Applications being developed include production planning and scheduling and materials control. Future developments will include Standard Costing, Plant Maintenance, Personnel, Quality Control.

Applications are invited from a wide range of systems staff, with or without programming experience, who can show ability and willingness to work with a minimum of direction and can meet the needs of users at all levels.

Candidates seeking opportunity, security and large company benefits who meet the requirements should write for application form to:

The Personnel Adviser (Administration), CPC (United Kingdom) Ltd., Falside Road, Pelsley, Tel: 041-884 5111, Ext. 102.

a member of CPC / Europe

## SUPERVISORY TECHNICAL AUTHOR

S.W. MIDDX. C. £7000

Our clients are a large manufacturing and marketing organisation. Their international business development group, based in London and Paris, is expanding at 30% p.a. Publications are of a high-quality professional standard, with an emphasis on comprehension by non-technical readers.

To maintain and improve the Group's publications, they now seek a Technical Author with the ability to supervise a growing team. Additionally, the post offers the opportunity to:

- develop into a more senior management role in the future
- learn computing (or increase your knowledge) and use computers for text editing
- make occasional short visits to France and elsewhere abroad

The opening will appeal to experienced Technical Authors, not necessarily with a computing background, who are able to express themselves clearly and concisely in English, and to supervise staff. Candidates should be well educated (ideally a degree or professional qualification) and should have had significant relevant experience.

Please ring us in confidence for an initial discussion, quoting ref. 888. Alternatively, leave a message on our answering machine after hours or write briefly:

Tel: 01-637 5796



EDP Systems  
52-53 Margaret Street  
London W1N 7FF

## QPAC Payroll System

### Two Senior Support Staff Required

£7000 and £5400 plus car and bonus.

From 1st October 1978 the QPAC Payroll System will be supported by QPAC Services Ltd. from new offices in Maidstone. The company will be introducing the extended facilities of the most widely used payroll system in the English speaking world as well as other packages.

Support staff are required from 1st September to train users and install the packages. A knowledge of QPAC is a distinct advantage. Applications should be in writing following the layout of any usual application form to:

Cliff Dillaway,  
DILLAWAY & SON LTD.,  
"Highcroft", Gunhouse Lane,  
Bowbridge, Stroud, Glos. GL6 2DB

### RESEARCH POST IN ECONOMICS

Applications are invited for a research post at University College London on a full-year programme of research on issues related to the distribution of income. The programme is directed by Professor A. D. Atkinson of UCL, M. A. King of Birmingham, and N. A. Winkin of Warwick. The work will involve the preparation of a research report on the distribution of income, particularly handling large-scale data sets and previous experience in this or in a comparable research would be valuable. The salary will be in the range £4,387-£5,508, plus £430 London Allowance.

Further details may be obtained from Professor Atkinson (CWL), Department of Economic Sciences, University College London, Gower Street, London WC1E 6BT.

## COMPUTING AND ELECTRONICS ENGINEERS

CHALLENGING OPPORTUNITIES FOR PEOPLE WITH SKILLS IN

### MICROPROCESSORS REAL-TIME PROGRAMMING NETWORKS LOGIC DESIGN

Daresbury Laboratory is developing major national facilities for research into atomic, molecular, solid state and biological sciences and nuclear physics. The exploitation of these facilities requires first-class computing and communications support. Computers at the Laboratory include an IBM 370/138, GEC 4070's, PDP-11's and Interdata.

We have vacancies in the following Groups

### COMPUTER NETWORKS

Programmers to develop communications software for interactive terminals, graphics and remote job entry access to the SRC's computing centres using microprocessor-based communications hardware and mini-computer packet switches and front-end processors.

### LOGIC DESIGN

Engineers to design interfaces for mini-computers — Work with the latest microprocessor techniques — Communications interfacing for remote data processing — Specialised design of data acquisition systems.

### DATA ACQUISITION

Hardware and Software personnel to design, develop and support on-line data acquisition systems on large experimental facilities.

Applicants should have a good honours degree in a relevant scientific discipline. Appointments will be made, depending on qualifications and experience, at HS0 and SO levels.

Scientific Officer £2839-4416  
Higher Scientific Officer £4101-6448  
plus non-contributory superannuation scheme, generous leave allowance, and flexible working hours scheme!

Closing date 14th July 1978.  
Applications from either send in writing or telephone Warrington 65000, Ext. 467, for an application form quoting reference number OL/626 to:

The Personnel Officer  
**DARESBURY LABORATORY**  
Science Research Council  
Daresbury, Warrington WA4 4AO

## Computer Marketing... Broaden your Outlook on the DP Industry

An opportunity exists to join the Marketing Department of Sperry Univac in its UK Headquarters in London. Sperry Univac, as one of the world's leading computer suppliers, markets a comprehensive product range covering all sectors of the Data Processing Industry.

You would join a group which is vitally concerned with both senior management and sales force in supporting corporate marketing objectives. Areas of responsibility would include the analysis of market conditions, the status of competitors and the launching of new products onto the UK market.

You are probably in your mid to late twenties seeking to further develop your career in marketing management. You are most likely to be currently employed in the computer industry but have a desire to broaden your horizons and gain experience of the total DP market.

SALARY & BENEFITS are commensurate with those of a large multi-national organisation and take into account the challenge this position offers.

For further information telephone Peter Lines on 01-963 0511 or write to Heather Green, Personnel Department, Sperry Univac Headquarters, Sperry Univac Centre, London NW10 8LS, for an application form.

**UNIVAC**  
COMPUTER SYSTEMS

# THORBAR

(RECRUITMENT AND CONSULTANCY SERVICES) LIMITED

Greenock House 19 Cuckfield Road Hurstpierpoint Sussex

Telephone 0273 833848

### SPECIALISTS IN DP AND EXECUTIVE RECRUITMENT

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## PROJECT LEADERS/ANALYSTS ANALYSTS/PROGRAMMERS (COBOL/PL/1 and/or ASSEMBLER experience)

COMMENCING SALARY CIRCA £7,250 p.a.

COMMENCING SALARY CIRCA £6,500 p.a.

### OPPORTUNITIES TO WORK WITH NEW UPGRADED IBM 370 AND MINI COMPUTER HARDWARE DUE FOR DELIVERY THIS YEAR.

In acting for our clients who are one of the leading U.K. Groups in the Leisure Industry, we are looking to identify candidates to fill the above roles who will gain the opportunity to work on the development and implementation of new financial and commercial systems. If you possess some or all of the following experience, then by contacting us now you will be taking the first step towards gaining an outstanding career development opportunity.

### PROJECT LEADERS/ANALYSTS

1. The successful candidates for this role are likely to be currently working in a Systems Team engaged in the design of commercially based applications with some experience of leading projects.
2. A sound programming background preferably gained from working with medium/large mainframes will be sought.

CONTACT US NOW EITHER BY TELEPHONE OR IN WRITING SO THAT WE CAN ARRANGE FOR EARLY INTERVIEWS TO TAKE PLACE EITHER

### ANALYSTS/PROGRAMMERS

1. Programmers with experience in Cobol, PL/1 or Assembler languages who have, or wish to have, systems involvement will be given the opportunity to implement small projects.
2. If you are currently a senior Programmer working with mainframe or mini hardware, and wish to develop into systems work, you should apply.

## SYSTEMS ANALYSTS

AYLESBURY  
£4600 to £6300

The Job  
• Expanding a successful financial application suite  
• Applying VME techniques  
• Developing financial models

The Installation  
• ICL 1803 and 1901T (New range being evaluated)  
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• OCR Reader

The Qualification  
• Two years' good system work, preferably with accounting background  
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D.P. Manager  
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Telephone: Aylesbury (0244) 54721

REDFIFFUSION

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CalComp is the world's leading manufacturer of computer aided design and drafting systems and in the last 2 years alone has doubled its turnover in the U.K. As part of this growth pattern we are expanding our steady communications product line and now need an additional top class sales engineer.

Products and Territory  
The successful candidate will be responsible, after initial training, for selling the full range of passive graphics products in Scotland and the North East of England. The product range includes drum, flatbed and COM plotting engines, on and off-line graphic controllers, digitizers and electrostatic plotters/printers.

Qualifications  
Working from home and probably living in the Edinburgh/Glasgow area, we would expect the successful candidate to have:

- \* proven experience and a good track record in the sale of computer peripherals;
- \* technical background and an understanding of scientific and engineering computer applications;
- \* an understanding of Computer Aided Design and computer graphics which, while not being essential, would be a distinct advantage.

Rewards  
This is an important appointment, in an established territory with a great deal of potential. Consequently, we are offering an excellent negotiable salary, good commission potential and a company car, plus the usual big company fringe benefits.

Please write to, or telephone: Don Crowley, CalComp Limited, Croy House, The Ring, BRACKNELL, Berks. Tel: Bracknell (0344) 50211.

**CALCOMP**

## ICI Plastics Division Bexford Manningtree Computer Services Section Leader

Owing to promotion there is a vacancy for a Computer Services Section Leader, responsible for managing a team of five people operating and maintaining a wide range of commercial systems. He or she will be expected to develop existing systems, to obtain a more integrated approach and to investigate and develop new systems to the changing needs of the business.

The qualifications required are as follows:  
A knowledge of IBM 370 and remote terminal working.  
A high level of knowledge and experience of Merk IV.  
An in-depth knowledge of IBM Job Control Language.  
An appreciation of PL/1.

The job holder will be given a broad experience in providing computer support to all areas of the business and will be given further training where necessary.

Interviews will be held in Management Services Department, Welwyn Garden City, the Headquarters of the Division, but the vacancy is based in Bexford in the attractive "Constable" country.

The salary will be around £4,500 plus bonus, profit sharing, etc.

Please apply in writing stating age, qualifications and experience to Mrs. Mervi Barton, Personnel Department, ICI Plastics Division, Bassett Road, Welwyn Garden City, Herts. Or telephone WGC 23400 ext. 2534.

**ICI**

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E.M.S. is planning substantial further development of both our Consultancy and Turnkey Systems Divisions during the coming months. Our consultancy activities extend across all mainframe ranges and encompass a wide range of Industrial/Commercial organisations. Applicants must, therefore, present as high level Business Analysts capable of rapidly assessing clients' requirements and proposing relevant solutions where appropriate or quantifying the relevant consulting experience required in either Systems or Programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resource support.

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## MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

### SYSTEMS ANALYST

#### BEDS/HERTS

This is an excellent opportunity for an Analyst to gain project leading experience implementing a range of new systems.

The person appointed will work initially on Work-in-Progress and Variable Costing systems to monitor performance in production areas, together with Budgetary and Forecasting systems for financial departments.

Candidates should have a flexible outlook and possess the ability to analyse and recommend solutions to a wide range of business problems. It is not necessary to have a programming background.

Excellent conditions of employment include Non-Contributory pension, and Life Assurance, Sports and Social Club, 4 weeks' holiday and where appropriate Relocation Expenses.

To £6,200

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### Word-processing

A company with an international reputation in the business computer field, long established in Europe, is now ready to launch an advanced shared logic word-processing system with very sophisticated advantages. The system has been developed and has been very successful in the United States. We are looking for a Product Manager who can start from the beginning in building the European marketing organization. This is essentially a staff position based in Amsterdam, working through national companies and distributors, and would be an outstanding challenge for a man who

wishes the satisfaction of creating something new.

Candidates should already be working with word-processing equipment and have gained several years' marketing experience in this field. Fluent English, with good French and German are sought. The basic salary will be good, but total earnings will be strongly related to achievement.

The identity of candidates will not be revealed to our client without prior permission. Applications, quoting Ref. A/924/CW, should include details of age, experience and current salary and be sent to:

### PA Management Consultants BV

184 Keizersgracht, Amsterdam, C. Holland. Tel: Amsterdam 23 66 82



A member of PA International

### RPG II PROGRAMMER

Basic Holdings, United II replacing its 380-20 with an IBM System 34 using on-line data entry facilities.

We wish to recruit a programmer to assist the Data Processing Manager in the conversion and development of new systems.

The successful candidate will probably have 18 months' 2-year experience in RPG II on System 32 or System 3 and will be capable of developing for the Data Processing Manager or the Data Processing Manager.

Good working conditions, contributory pension scheme and team officer in staff restoration.

Please apply for application form to:

Miss E. J. Lowe  
Personnel Officer  
BOWATER SCOTT CORP LTD  
Cox Lane, Cheshunt, Herts, EN7 5LS  
Tel: 01-897 5141

IF YOU ARE A  
Foreigner, Cobol, PL/I,  
PASCAL, COBOL, RPG II,  
PROGRAMMER,  
BASIC, VIP CONSULTANTS  
INTERNATIONAL  
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NORTH AMERICA

## HERTS/MIDDLESEX NOTICE TO SYSTEMS ANALYSTS

Haymarket Computing are D.P. recruitment specialists to 35 companies in the Herts/Middlesex area. Such is the current computer employment market that at any one time almost all of these companies have vacancies for Analysts end/or Programmers. At the present moment, however, our most urgent need is for Analysts on behalf of 12 clients in the following areas:

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Greenock House 19 Cuckfield Road Hurstpierpoint Sussex

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SPECIALISTS IN DP AND EXECUTIVE RECRUITMENT

### ESSEX

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**SALARY TO £7,500**  
+ Relocation Expenses where necessary

AN EXCITING OPPORTUNITY TO USE YOUR SYSTEMS KNOWLEDGE IN HIGH TECHNOLOGY AREAS

We are acting for a world-famous company who have developed very sophisticated Hardware and Software and require people with a good background in systems and programming to develop in this professional environment.

The background of the people required should ideally be in a systems area, preferably Database On-line and they should be able to demonstrate the ability to control systems projects.

The application areas although sophisticated, are extremely interesting and job interest being of the greatest importance these days, can certainly be offered.

In addition the career opportunity can certainly be demonstrated and it is indeed a company that welcomes ambitious and talented people.

PLEASE TELEPHONE OR WRITE IMMEDIATELY FOR MORE DETAILS.

## BOWATER SCOTT CORP LTD GRAVESEND, KENT

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(£3,750 including shift allowance)

Applications are invited for the post of Computer Operator. The work involves building new and enhanced operating systems and standard software products from components produced by the Software Development Group. These products are then supplied directly to users and, where appropriate, tailored to their special needs. Customer Support is our external interface to the customer for the supply of standard software. Follow-up responsibilities include consultancy, advising users on various facilities, investigation and solution of users' problems. In addition to the building and supply of standard products, opportunities exist for the development of special systems and on-going liaison with field experience to improve existing products.

Relevant programming experience includes mini computer operating systems, including control systems, communications systems, on-line applications, customer support and liaison and the supply of mini-computer software packages.

These posts are based in South Manchester but may involve some travel to user sites in the UK and abroad. This is an area with excellent communications which, whilst convenient for liaison, also provide fast access to leisure areas including the Peak District, North Wales and the Lake District. Close proximity to both the Cheshire countryside and urban facilities make the area especially attractive.

The Company is long established in the design and manufacture of mini-computers and has an acknowledged international reputation. The usual large company benefits are available and appropriate relocation expenses will be met by the Company.

Please write, enclosing your curriculum vitae, to Mr. G. Turner, Services Manager, Design Department, Ferranti Computer Systems Limited, Simonsway, Wythenshawe, Manchester M22 5LA, quoting reference 78WD24/CW or telephone 061-428 3644 ext 200 (reverse charge) for further information.

## FERRANTI Computer Systems

**INSTITUTE OF  
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SCIENCES  
SCIENTIFIC  
OFFICER/HIGHER  
SCIENTIFIC OFFICER  
NUMERICAL METHODS  
IN WAVE BREAKING**  
The Institute of Oceanographic Sciences is seeking a post-graduate in numerical modelling for the dynamics of high waves and is looking for someone with high ability in numerical analysis in work on this project.

**Qualifications:**  
A honours degree or equivalent qualification in Mathematics or Computing with first in applications or numerical methods in fluid mechanics is desirable. At least 2 years' relevant post-graduate experience is required for Higher Scientific Officer.

**Salaries and Conditions:**  
Appointment will be made as a Scientific Officer (H.S.O.) or Higher Scientific Officer (H.S.O.I.) depending on qualifications and experience, on the following salary scales:

S.0 £2338 p.a. - £4415 p.a.  
H.S.O. £4101 p.a. - £5446 p.a.

Starting pay may be above the minimum.

Staff of the Council are not Civil Servants, but their pay and conditions are similar to those of the Civil Service.

There is a non-contributory pension scheme and generous leave allowances.

Application forms and further particulars are obtainable from:

The Secretary  
The Institute of Oceanographic Sciences  
Brook Road  
Walton  
Falmouth  
Cornwall  
TR10 9LS

Telephone: (0320) 270 563  
Closing date for application: 10 July 1979

**NEWCASTLE UPON TYNE  
POLYTECHNIC**  
Department of Mathematics  
Computer Systems and Computing

**LECTURER II  
IN  
COMPUTING**

Applications are invited to fill a post of Lecturer II in Computing.

The person appointed will be required to teach a range of computing modules, including the design and analysis of computing systems, and to contribute to the development of computing courses.

Applications should be submitted by 15 June 1979.

**WANTED  
TRAINEE  
SALES PERSON**

For enthusiastic highly motivated sales professionals and recent graduates. You must have a minimum of 2 years' experience in a sales or marketing area of computing or data processing, or be able to demonstrate relevant experience.

For further information, please apply to:

Mr. J. M. Mitchell

PA Management Consultants BV

184 Keizersgracht, Amsterdam C. Holland

Telephone 020 454 7906

## COMPUTER PROGRAMMER/ANALYST North Sea Oil

Occidental, one of the most progressive and successful oil companies operating in the North Sea, have a small, highly-skilled team of computer specialists, who play a significant role in providing technical and commercial data processing services to the entire operation.

The increase in these activities has created an opportunity for an experienced Programmer/Analyst who can take on the complex responsibility for developing and maintaining programmes and systems for a wide range of engineering applications, with the minimum of guidance.

Candidates, male or female, should have an engineering degree and a minimum of 4 years' experience in technical data processing, preferably including process control application. Familiarity with time-sharing and data-base

techniques and experience in linear programming or API would be helpful. Initiative and enthusiasm will be readily encouraged and our progressive approach to technical innovation guarantees a stimulating working atmosphere.

A competitive salary is offered, and fringe benefits will include free life insurance and generous relocation assistance where appropriate. If you have the necessary qualifications and experience, and are seeking a challenging and rewarding career with a forward-looking company, please apply in writing, giving brief personal and career details.

Mrs. Ann Reynolds,  
Occidental Petroleum (Caledonia) Limited,  
127, Cawdorway,  
Aberdeen,  
AB2 3TP.

our progress

**OXY**

Profit from

our progress

**OVERSEAS POSITIONS**

Openings presently exist for OPERATOR TECHNICIANS to work in foreign locations on mini-computer based system data processing systems. Successful applicants should have H.N.C. or military equipment, with at least one year's experience working with mini-computers and peripherals.

Send resume to: JANET MITCHELL  
Western Geophysical Company  
288-290 Weston Road, Isleworth, Middlesex.

# What would make you take on a computer job in Aberdeen?

## The place?

Aberdeen, the Granite City, is almost certainly one of the most beautiful cities in Europe. It is surrounded by the scenic attractions of the Scottish Highlands and has for many years been one of the United Kingdom's main fishing ports. But now with the advent of North Sea Oil, it is an even more prosperous and thriving community. Aberdeen is a port, a University town, an excellent shopping centre, a forward looking city with a great future.

## The life?

All year round Aberdeen is a hive of activity, that goes for anything from mountain climbing to music making. It is only to be expected from the city that gave Scotland her first painter, her first performed play, her first poet, and all of Britain's first University course in Medicine! A city of sport, of the arts, of learning—a city with a rich past and an equally rich present.

## The climate?

Our climate is generally good, with hot summers that have made Aberdeen a popular holiday resort and sharp winters, which are an advantage for the winter sportsman or woman. We are within easy reach of Aviemore and Glenshee, with the Grampian mountains on the doorstep.

## The employer?

The North of Scotland Hydro-Electric Board is responsible for supplying electricity to over 25% of the landmass of Great Britain. We know our business and do our job well. Our accounting and engineering departments make extensive use of our computers and are now expanding their computer based activities.

## The money?

The panel opposite gives an idea of the salary scales we are offering, but the actual salary will depend entirely on you. Your experience and ability are what we need and we are willing to pay for it. If you are looking for a real career with opportunities for advancement in a growing organisation look no further. Assistance will be given with moving expenses where necessary.

## The challenge?

We are now expanding our computer centre in Aberdeen and will be installing a large new configuration with a comprehensive terminal network to replace our existing ICL System 4 computers. Engineering programs extend through generation, transmission and distribution. Commercial activity—apart from billing, payroll and accounting—will be extensively developed into management accounting and enquiry processing. A challenge indeed, but if you think you can meet it read on.

## Commercial

### SENIOR SYSTEMS DESIGNER

£5495-£7145

Minimum of 4 years' experience, ability to control projects.

### Programming

### SENIOR PROGRAMMER

£4660-£6130

Minimum of 3 years' Cobol experience. Ability to lead projects.

## Engineering

### SENIOR SYSTEMS DESIGNER

£5495-£7145

Minimum of 4 years' experience, ability to control projects.

### SYSTEMS ANALYSIS

£3985-£6130

Minimum experience 2 years.

Engineering background or qualification on advantage.

Salary and conditions of employment are in accordance with the NJC Agreement for the Electricity Supply Industry with plating on PAG Grade plus productivity payment currently giving the total earning potentials as shown above.

If you are interested and want to know more about any of the above posts, contact our Computer Services Manager now.

**North of Scotland Hydro-Electric Board, Computing and Accounting Centre, Ashgrove Road West, Aberdeen AB9 2NY Telephone (0224) 692671**

# Informatix UK & Overseas Index

## Phone 01-831 6055

Informatix 24 Gray's Inn Road London WC1X 8HR Telex 299539 HAVEN G



POSITION	SALARY	EMPLOYER	LOCATION	SOFTWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
Systems Analyst	c £6,500	Software House	Central London	IBM/Minis	Unusual opportunity for an analyst with commercial systems experience to develop projects from proposal through to implementation on a variety of machines.	25/1
Graduate/Programmer	to £5,500	Bureau	Surrey	Any	Graduates with Engineering, Maths, or Computing Degree and FORTRAN required to work on software/scientific applications. 2 years+ programmers also required.	25/2
Programmers	to £6,500	Commercial Services	Surrey based	OS/DPB, etc.	Programmers with ASSEMBLER/COBOL experience required to develop commercial systems for a wide range of minis.	25/3
Senior Analyst/Project Manager	£12,000+ TAX FREE Accom ++	International Airline	Middle East	IBM DOS	Extensive experience of Airlines Schedule planning. Previous experience of Operational Research is essential and statistical background a distinct advantage.	25/4
Programmers/Analysts	to £8,000+	Banking	EC4	DP/II	Excellent employment package available to analysts/programmers with in-depth knowledge of systems and programming preferably with real-time experience.	25/5
Analyst/Programmer	to £8,000 TAX FREE Accom ++	Construction Services	Middle East	IBM DOS	Urgently required—analyst/programmers with 2 years+ RPG/COBOL experience to work on financial/planning applications. 1-year renewable contract available.	25/6
Analyst/Programmer/Programmer	to £8,000 + bonus + City allow	Systems House	S.W. Essex	POP	18 months+ experience of working on Minis in commercial environment. Able to work on two initiatives.	25/7
Consultant/Programmer	c £7,500	Software House	E. Burke	Minis	Mini-computer professionals with commercial and real time experience urgently required for this well-established organisation.	25/8
Senior Systems Analyst	c £6,300	Import/Export	EC2 and European Travel	IBM 370/148	Solid systems experience, including work on minis and telecommunications systems and responsibility for implementation of at least one major system.	25/9
Analyst/Programmer/Programmers	to £7,000	Bureau	EC1	Boroughs	Programmers with Boroughs COBOL on middle range machines urgently required for interesting and varied work in a stimulating environment.	25/10
Systems Analyst	to £8,000 + City	Equipment Manufacturer	Central London	Intelligent Terminals	Opportunities for self-starters with 3 years+ analysis experience who wish to enjoy a challenging and satisfying career.	25/11
Systems Analyst	£10,000 TAX FREE Accom ++	Service Bureau	Saudi Arabia	IBM DOS	Versatile systems analyst required to work on demanding projects to service environment.	25/12
Analyst/Programmers	£7,500	Systems Support	Central & SE London	IBM/1900	Unique opportunity for 1900 COBOL/PL/I/DRIVER person to learn IBM.	25/13
Project Leader	to £12,000+	Manufacturer	Switzerland	POP/II	OP professionals with all-round systems and programming software experience and a degree urgently required for these challenging positions.	25/14
Contract Personnel	£180+ p.w.	Various	London SE England	IBM, ICL, Burroughs, DEC, Honeywell	COBOL, RPGII, Assembler, PL/I, BASIC+, programmers with 2 years+ experience urgently required.	25/15
Systems Programmers	to £11,000 TAX FREE Accom ++	Engineering Consultancy	Middle East	IBM DOS	Systems programmers with OS/VS POWER to maintain/evaluate minicomputer software and system lines. Required for 1-year renewable contracts.	25/16

## UK SALARY

to £8,500+

to £6,750+

to £6,500+

## + PROFIT SHARE BONUS

## CENTRAL LONDON & MIDDLE EAST PROJECT LEADERS ANALYST/PROGRAMMERS PROGRAMMERS

**Our clients, an international Software House with Headquarters based in Central London, have signed several turnkey projects overseas and are urgently seeking ambitious people to develop their systems in London, in view of planned expansion staff are required at all levels to join Project Teams to implement systems on site. Applications range from general commercial systems to the more specific, airlines, hotels and financial on-line systems.**

### Project Leaders

With a background of analysis and programming and experience in leading a team of at least six. Capable of organising turnkey systems including implementation and training.

### Analyst/Programmers

Experienced in writing detailed systems and programming specifications and able to deal with first-time users in an overseas environment.

### Programmers

Who can cope with challenging projects within this Software House. Languages are immaterial although much of the work is based on Minis and a knowledge of BASIC would be an advantage.

Generous overseas allowances and accommodation are available whilst working abroad.

Interviews are being held throughout the months of June and July, and offers will be made to successful candidates within one week.

# THE SALES BIT Resistance to change — PART III

IN the computer business, particularly with first-time users, many of the objections put forward are symptomatic of resistance to change.

1: We're not ready for computers.  
2: We have too many other problems at present.  
3: It will cost too much.  
4: The unions will never agree.  
5: We've been through this before.  
6: Our existing methods are adequate.  
7: We will have to change our present systems.

8: We don't have any real problems.  
9: Who else has installed such a system?  
10: We have a computer at head office.  
11: Your system wouldn't work here.  
12: That doesn't apply to us.  
13: That's against company policy.  
14: I'm too busy to get involved.  
15: We'll give it some consideration.  
16: Our requirements are unique.

17: It's more trouble than it's worth.  
18: Your package is not comprehensive enough.  
19: We couldn't consider having our files off the premises.

20: We just took delivery of a computer system from one of our competitors.

21: Ah well, you can't win them all—so you can keep in touch!

## TRADER

## Opportunities in the Midlands

From page 21  
swinging back the other way and Midland companies were again buying their own hardware. Many firms found that interactive computers were unnecessary and invested in minicomputers.

The newly started course was a BSC in computer science, from which students would start graduating in three years' time. I think this was created as a response to the demand," said Cross.

A spokesman for the University of Birmingham said it had "an enormous computer commitment."

"We've got a lot of teaching, both for people going into the computer business and for people going into other walks of life who want to know about computers," he said.

The use of computers has exploded in the field of research, for which the University is renowned, and it therefore employs a number of computer staff of its own. A new interactive computer costing £500,000 is to be installed at Birmingham University next year.

## Puzzle answer

It is clearly 1, and this helps considerably with the analysis of the units column. Y and L can only be 1, 3, 7 or 9, since BOY and GIRL are primes.

E = 1 rules out 1, and also 9 (because Y and L are complements modulo 9).

E = 1 rules out 1, and also 9 (because Y and L are complements modulo 9). G must surely be 8 or 9, so the calculation is well on its way. The solution is, in fact, 457 + 8,823 + 3,501 = 13,801.

## South West Thames Regional Health Authority

SHIFT LEADER  
SENIOR OPERATOR  
OPERATOR

From £5659\*  
From £4497\*  
From £3800\*

The introduction of 2 shift working has created the need for additional operations staff to be based at the regional computer centre located in the grounds of The Springfield Hospital, Tooting, London SW17.

Current hardware includes a powerful ICL 1903T running under George 3 therefore applicants should have worked on ICL 1900 hardware, preferably in a George 3 environment.

The Shift Leader and Senior Operator posts will be of particular interest to people currently holding these posts

**Freelance Contracts MODEM** Permanent Positions  
Consultants in Data Processing

## MANAGEMENT SERVICES

Our Management Services Department provides a computing facility on a dual IBM 370/158 installation for the Division's diverse commercial and engineering functions. To assist in this work, we urgently require the following personnel.

## Computer Programmers

Vacancies exist within the application programming section for experienced Programmers to work on a variety of batch and on-line applications. Experience of any or all of the following would be an advantage: OS/VSI, ANS COBOL, IMS, DB & DC, BAL.

## Trainee Programmers

Applications for Trainee Programmers will be considered, with a minimum qualification of GCE 'A' level, preferably Maths, and/or some DP experience.

Competitively salaries are offered for these positions, which provide scope for further career progression, in addition to conditions of service appropriate to a major concern. Relocation assistance will be offered where appropriate.

Please write c/o or telephone for an application form.

Mr. J. Jaine  
Ref. C4898, Personnel & Training Dept., Site A  
British Aerospace Dynamics Group  
Stevenage Bristol Division  
Six Hills Way, Stevenage, Herts SG1 2DA  
Telephone Stevenage 2422 Ext. 2908  
(Out of Office Hours, Stevenage 2878)

## BRITISH AEROSPACE

DATA PROCESSING DIVISION  
Stevenage

Knight is right  
for contract staff

Knight 01-491 4706  
Sister Division: ABAC Data Processing  
56  
Knight Computer Services Ltd, 14 Old Park Lane, London W1Y 4NL

Carterbury  
City CouncilSenior  
Systems  
Analyst/  
Programmer

APS/SOI £2433-£3065 (Incl.)  
(pay award pending)

Applications are invited for the above posts from suitable qualified and experienced persons. The Council operate an ICL 2904 computer at the present time but this is to be replaced by a new computer in 1978 with an ICL 2903 using FOS 800 and VDT's. The new computer will be housed in a purpose built computer centre situated outside the attractive City of Canterbury. The post offers an ideal opportunity for a computer professional to obtain job satisfaction from working on a wide variety of projects and to become involved in the Council's plans for the implementation of on line systems.

A Casual User Car Allowance is payable.

Consideration will be given to housing accommodation and a generous disturbance allowance scheme is in operation.

Closing date: 7th July, 1978 Interview date: 17th July, 1978

Application forms may be obtained from the Personnel Officer, 3 Marlowe Avenue, Canterbury, Kent CT1 2ON. Telephone: Canterbury 51765 Ext. 12.

who have attained a good technical standard in George 1 and now wish to develop their supervisory and management skills.

The person appointed as Shift Leader will be responsible for all computer room activities in addition to which he or she will be expected to liaise closely with other operations department section heads.

For further details phone Les King up to 8 p.m. or write to Modern Computer Services Limited, FREEPOST, London WC2N 5BR. 01-839 3351.

Includes bus allowance and London Weighting.

ANALYST/PROGRAMMER  
LONDON £7,000

The International Data Centre of an American Bank, located in London, requires a Senior Analyst/Programmer to join its systems and programming team. Current hardware is ICL based but the planned development programme will replace this with IBM S/370.

Futuro software will include OS/COBOL, C.I.C.S. and I.D.M.S.

The ideal candidate for this position will have at least 4 years' experience in the design and programming of on-line systems. A knowledge of banking systems would be a considerable asset.

A salary of around £7,000 is offered together with an attractive benefit package that includes mortgage subsidy, travel loans, non-contributory pension and Life Assurance schemes.

For a preliminary discussion contact Ian Beeson.

Interviews can be arranged in London.

LONDON BOROUGH OF ULLSWATER  
ULLSWATER TECHNICAL COLLEGE,  
Park Road, Ullswater, Midas.  
Department of Science & Social Studies

LECTURER  
(GRADE II)  
in Computing

Required for September 1978 grants in a suitable discipline to teach Computing and some Mathematics throughout the College.

Teaching qualification and relevant experience in Industry, Research or teaching desirable.

Salary £2495-£2777 plus supplement plus London Allowance.

Application form and further particulars from the Principal, Ullswater Technical College, Park Road, Ullswater, Midas, returnable within 14 days.

Ian Beeson, Gemini Computer Systems Ltd.  
160-162, Highgate, London NW1 8PL  
01-341 1111, 01-341 1112, 01-341 1113

GEMINI Recruitment

PROGRAMMERS  
ANALYST/PROGRAMMERS TO £3999 PLUS  
SUPPLEMENTS AND PROFIT SHARE

## CHESHIRE

Our client, a large commercial organisation in North Cheshire, are seeking 10M COBOL or ASSEMBLER Analyst/Programmers. You should have 2+ years' experience, using IBM or possibly the best sports and social amenities available in the north of England.

SYSTEMS PROGRAMMER TO £4900  
ANALYSTS TO £4900  
PROGRAMMERS TO £4600  
PLUS 10% IN AUGUST

## PRESTON

A medium-sized 1900 user in Preston are seeking six experienced staff. The Systems Programmer must have GEORGE 11 with PLAN and will preferably have some COBOL experience. The Analysts and Programmers will have a commercial 1900 COBOL background.

SYSTEMS PROGRAMMER  
SYSTEMS DESIGNERS  
UP TO £6200  
LEEDS

A large 370 user in Leeds are seeking additional staff for their developing DP department. The Systems Programmers must have an Assembly background and the Systems Designers COBOL preferably gained on IBM hardware. In addition to salaries, there is a productivity bonus and profit sharing scheme and relocation expenses will be paid.

PROGRAMMERS TO £5000  
ANALYST/PROGRAMMERS TO £5200  
SENIOR OPERATORS TO £4000

## MERSEYSIDE

One of the largest CTC users in the north require a number of experienced DP staff. Analysts, Programmers and Programmers must have good commercial COBOL experience. Senior Operators must have a large operating system/hardware background. The company offers attractive fringe benefits and where appropriate will pay relocation expenses.

PROGRAMMERS, ANALYST PROGRAMMERS  
ANALYSTS, PROJECT LEADERS TO £7500  
+ BONUS

## MANCHESTER OR LONDON

The organisation is recognised as being the leaders in their field in the UK and Europe. Due to the increase in current projects experienced staff are required. IBM, COBOL, PL/I or BAL plus DB or TP.

## CONTRACT REQUIREMENTS

ZURICH, ANALYST PROGRAMMERS, PL/I COBOL with CICS.  
GENEVA, ANALYST PROGRAMMERS PDP 11/70  
MANCHESTER, PROGRAMMERS 2904 with operations experience  
MANCHESTER/YORKSHIRE, PROGRAMMERS COBOL, CICS  
MANCHESTER, PROGRAMMERS PL/I IMS

The above requirements are for our clients in Europe, provide 24-hour telephone service.  
For further information, please contact Mr. Peter Williams, 01-353 0981.

MYRIAD  
OPERATIONS

Computer Personnel Consultants

## OPERATORS

Are you interested in:

- ★ New IBM 370/138
- ★ DOS/VS POWER
- ★ T.P. Network
- ★ East London
- ★ 2 Shifts covering 7.30 a.m.-10.30 p.m.
- ★ c £4,000
- ★ Good Training and Career Prospects

If you would like to know more about this excellent opportunity ring now quoting reference E1/2206.

24-hour answering service  
Please telephone for a confidential discussion or write:  
30 Fleet Street, London EC4Y 1AA  
01-353 0981

## CLIENT SERVICE MANAGER

LONDON, W1

£7,500

We are looking for a dynamic and flexible person to manage the servicing of several hundred small firms using our computerized accounting service. Technical experience is less important than a sound grasp of the disciplines of the computer.

We expect you to have a strong knowledge of commercial accounting.

For further details ring:

JACK SCHUMANN on 01-580 0088 or write to  
BOX NO. 1988, Computer Weekly, Stamford House,  
Stamford Street, London SE1 9LU

Ian Beeson, Gemini Computer Systems Ltd.  
160-162, Highgate, London NW1 8PL  
01-341 1111, 01-341 1112, 01-341 1113

GEMINI Recruitment

ASCII through the  
Logic Gate

An epic in 32K words, by Richard Forsyth

## Block 3 (The Inter-Block Gap)

Cleo has engineered Hex's release from captivity in Sprocket's hole by hacking Bill Bowzer's dope vector. Hex has lured up Asciil over an asynchronous serial interface and is driving him by remote control for fear that his own logic circuits have been damaged.

As they veered and swerved they came to the crest of yet another hill. They had now attained a height of 2,903 metres and on both sides the mountains of the southern Sierra Nieve (New Range) towered even higher. In front of them, stretched out in the sunrise, was a magnificent view over the fertile plain, causing a costly delay while he ran back to retrieve the dog.

"It's not very easy steering him," Hex said defensively. "He investigates on polar co-ordinates, whereas I'm a Cartesian myself."

Cleo just rubbed her bruise in silence.

"This is not going very well," thought Hex. "I was supposed to be riding to her rescue on my shining charger but instead she rescued me, and now it looks as though I'm holding her back." Unfortunately the split-second lapse in concentration caused by this thought was enough to let Asciil plunge off the path.

They moved off the trail and climbed a short distance into the hills. Hex hoped to find a little cove or at least an overhanging ledge where they might be safe from observation, but before long they were met by a sheer wall of almost vertical rock.

Hex shrugged off his defeat, began the difficult manoeuvre of turning Asciil through 180 degrees. But the dog's wheels headed down into the crevices, spinning uselessly. Hex wedged his shoulder under Asciil's chin and his legs firmly against the rock face and heaved for all he was worth.

Cleo heard a sharp crack, then a loud grinding sound. She spun round to see Hex and Asciil disappearing beneath the surface of the earth. She rushed over and peered down into the hole into which they had vanished so suddenly.

"Are you all right?" she called.

"Hex's answer echoed back: "Yes, come on in. It's just what we were looking for."

She turned over and curled up. Hex took off his greatcoat and spread it over her. So fast had she fallen asleep that she just mumbled a groggy thank-you without opening her eyes.

Sam, Hex turned it over in his mind. A new name seemed as good a way as any to start a new role in life. But he was too sleepy to pursue that train of thought, and drifted off into unconsciousness.

"She turned over and curled up. Hex took off his greatcoat and spread it over her. So fast had she fallen asleep that she just mumbled a groggy thank-you without opening her eyes.

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